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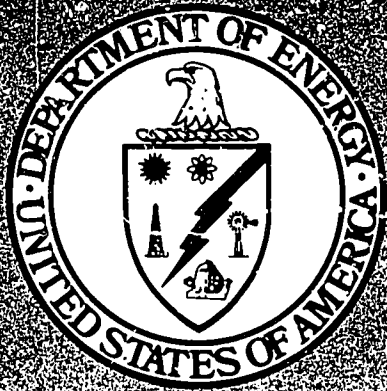
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ABSTRACT

Examined are the educational and employment characteristics of scientists and engineers who graduated during the years 1972, 1974, 1975, and 1976, with special attention to those whose work involves energy. The characteristics of energy-related graduates to those of more experienced scientists and engineers involved in energy activities are compared. Presented for the first time are tabulations on employment involving specific energy sources and activities. Other characteristics discussed include educational level, salary, primary work activity, type of employer, and the proportion of graduates who found employment in their major fields. Data are from the 1976 and 1978 National Surveys of Recent Science and Engineering Graduates, and the 1976 National Survey of Natural and Social Scientists and Engineers, sponsored by the National Science Foundation and the U.S. Department of Energy. (Author/WB)

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ENERGY-RELATED SCIENTISTS AND ENGINEERS:

A Statistical Profile of Recent Entrants into the Work Force, 1978

By
Sharon E. Bell

December 1979

Work Performed Under Contract No. EY-76-C-05-0033

Division of Labor Affairs and Manpower Assessment
Office of Education, Business and Labor Affairs
United States Department of Energy

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ENERGY-RELATED SCIENTISTS AND ENGINEERS:

**A Statistical Profile of Recent Entrants
into the Work Force, 1978**

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This report is based on work performed under Contract Number DE-AC05-76OR00033 between the Department of Energy, Division of Labor Affairs and Manpower Assessment (Office of Education, Business and Labor Affairs), and Oak Ridge Associated Universities.

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FOREWORD

This report examines the educational and employment characteristics of scientists and engineers who graduated during the years 1972, 1974, 1975, and 1976, with special attention to those whose work involves energy. The characteristics of energy-related graduates are also compared to those of more experienced scientists and engineers involved in energy activities. Information is based on the results of the 1976 and 1978 *National Surveys of Recent Science and Engineering Graduates*, and the 1976 *National Survey of Natural and Social Scientists and Engineers*, sponsored by the National Science Foundation and the U.S. Department of Energy.

Tabulations are included for the first time on employment involving specific energy sources and activities. Other characteristics discussed include educational level, salary, primary work activity, type of employer, and the proportion of graduates who found employment in their major field.

Norman Seltzer, Chief
Manpower Assessment
Office of Education, Business and
Labor Affairs

TABLE OF CONTENTS

Foreword	iii
Introduction	1
Data Description	1
Defining Energy-Related Scientists and Engineers	2
Energy-Related Scientists and Engineers	5
Major Field of Study	5
Occupation	5
Energy Source	6
Energy-Related Activity	6
Total Population and Energy-Related New Entrants	23
Major Field of Study Versus Occupation	23
Educational Attainment by Major	23
Educational Attainment by Occupation	23
Race	24
Sex	24
Type of Employer	25
Primary Work Activity	25
Type of Employment	26
Median Salary	26
Comparison of 1976 and 1978 Surveys of Recent Graduates	43
Major Field and Occupation	43
Educational Attainment	44
Race	45
Sex	45
Type of Employer	46
Primary Work Activity	46

Comparison of Recent Graduates with the Experienced Work Force.	65
Major Field and Occupation.	65
Sex and Race.	66
Type of Employer.	67
Primary Work Activity	67
Notes	76

Appendix A - Additional Tables

Appendix B - Questionnaire Used in 1978 National Survey of Recent
Science and Engineering Graduates

Appendix C - Questionnaire Used in 1976 National Survey of Recent
Science and Engineering Graduates

Appendix D - Questionnaire Used in 1976 National Survey of Natural
and Social Scientists and Engineers

LIST OF TABLES

1	Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1972 Graduates in 1978.	8
2	Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1976 Graduates in 1978.	9
3	Occupation of 1972 Graduates: Total Versus Energy-Related Graduates in 1978.	10
4	Occupation of 1976 Graduates: Total Versus Energy-Related Graduates in 1978.	11
5	Major Energy Source Involved in Energy-Related Activities Versus Occupations of Energy-Related 1972 Graduates in 1978	12
6	Major Energy Source Involved in Energy-Related Activities Versus Occupations of Energy-Related 1976 Graduates in 1978	13
7	Primary Work Activity Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1972 Graduates in 1978 . .	14
8	Primary Work Activity Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1976 Graduates in 1978 . .	15
9	All Energy-Related Activities Involved in Occupations of Energy-Related 1972 Graduates in 1978.	16
10	All Energy-Related Activities Involved in Occupations of Energy-Related 1976 Graduates in 1978.	17
11	Major Energy-Related Activity Involved in Occupations of Energy-Related 1972 Graduates in 1978.	18
12	Major Energy-Related Activity Involved in Occupations of Energy-Related 1976 Graduates in 1978.	19
13	Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978.	20
14	Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978.	21
15	Comparison of Major Field of Study for Highest Degree Held and Occupation: Total Versus Energy-Related Graduates in 1978	28
16	Comparison of Major Field of Study for Highest Degree Held and Occupation: Master's Versus Bachelor's in 1978.	29
17	Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1972 Graduates in 1978.	30

18	Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1976 Graduates in 1978.	31
19	Educational Attainment by Occupation: Total Versus Energy-Related 1972 Graduates in 1978	32
20	Educational Attainment by Occupation: Total Versus Energy-Related 1976 Graduates in 1978	33
21	Percentage Non-White: Total Versus Energy-Related Graduates in 1978.	34
22	Percentage Female: Total Versus Energy-Related Graduates in 1978. .	34
23	Type of Employer by Occupation: Total Versus Energy-Related 1972 Graduates in 1978.	35
24	Type of Employer by Occupation: Total Versus Energy-Related 1976 Graduates in 1978.	36
25	Primary Work Activity by Occupation: Total Versus Energy-Related 1972 Graduates in 1978	37
26	Primary Work Activity by Occupation: Total Versus Energy-Related 1976 Graduates in 1978	38
27	Employment Status: Total Versus Energy-Related 1972 Graduates in 1978.	39
28	Employment Status: Total Versus Energy-Related 1976 Graduates in 1978.	39
29	Median Salary: Total Versus Energy-Related 1972 Graduates in 1978 .	40
30	Median Salary: Total Versus Energy-Related 1976 Graduates in 1978 .	41
31	Comparison of 1978 and 1976 Survey: Percent Energy-Related Versus Major Field of Study for Highest Degree Held.	47
32	Comparison of 1978 and 1976 Survey: Percent Energy-Related Versus Occupation.	48
33	Comparison of Major Field of Study for Highest Degree Held and Occupation: Total Versus Energy-Related Graduates	49
34	Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1972 Graduates in 1978.	50
35	Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1974-75 Graduates in 1976	51
36	Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1976 Graduates in 1978.	52

37	Educational Attainment and Occupation: Total Versus Energy-Related 1972 Graduates in 1978.	53
38	Educational Attainment and Occupation: Total Versus Energy-Related 1974-75 Graduates in 1976	54
39	Educational Attainment and Occupation: Total Versus Energy-Related 1976 Graduates in 1978.	55
40	Comparison of 1976 and 1978 Survey: Percent Non-White, Total Versus Energy-Related Recent Graduates	56
41	Comparison of 1976 and 1978 Survey: Percent Female, Total Versus Energy-Related Graduates	57
42	Type of Employer by Occupation: Total Versus Energy-Related 1972 Graduates in 1978.	58
43	Type of Employer by Occupation: Total Versus Energy-Related 1974-75 Graduates in 1976.	59
44	Type of Employer by Occupation: Total Versus Energy-Related 1976 Graduates in 1978.	60
45	Primary Work Activity by Occupation: Total Versus Energy-Related 1972 Graduates in 1978	61
46	Primary Work Activity by Occupation: Total Versus Energy-Related 1974-75 Graduates in 1976.	62
47	Primary Work Activity by Occupation: Total Versus Energy-Related 1976 Graduates in 1978	63
48	Percent Energy-Related: Recent Graduates Versus Experienced Workers.	68
49	Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	69
50	Percent Non-White: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	70
51	Percent Female: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	71
52	Type of Employer Versus Occupation: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	72
53	Primary Work Activity of Scientists and Engineers: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers	73

54	Primary Work Activity of Engineers: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	74
55	Primary Work Activity of Scientists: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers.	75

INTRODUCTION

In recent years, national attention has increasingly focused on energy--where to get it and how best to use it. Current concerns include developing new supplies of conventional energy, developing alternative sources of energy, and conserving the energy supplies now available. The need for people with appropriate skills to perform the tasks associated with these problem areas has drawn attention to education, training, and employment in energy-related activities. This report examines the characteristics of scientists and engineers who graduated during the years 1972, 1974, 1975, and 1976, with special attention to those whose work involves energy. The information is based on the results of the 1976 and 1978 *National Survey of Recent Science and Engineering Graduates*, sponsored by the National Science Foundation (NSF). The 1978 survey, for the first time, included questions on employment in specific types of energy fields and activities. The sample size was also enlarged in the second survey to include more energy-related graduates. Funds for these changes were provided by the Division of Labor Affairs and Manpower Assessment, the United States Department of Energy (DOE).

DATA DESCRIPTION

The first two sections of this report present data from the 1978 *National Survey of Recent Science and Engineering Graduates*, conducted by Westat, Inc. for the National Science Foundation and the U.S. Department of Energy. Westat surveyed 14,439 science and engineering graduates; 6,529 earned a bachelor's or master's degree between July 1, 1971 and June 30, 1972 (1972 graduates); and 7,910 received a bachelor's or master's degree between July 1, 1975 and June 30, 1976 (1976 graduates). Responses from these individuals were weighted to represent a total of 376,000 1972 graduates, and 377,000 1976 graduates. A copy of the questionnaire can be found in Appendix B.

The third section of this report compares the results of the 1976 and 1978 *National Survey of Recent Science and Engineering Graduates*. The shorter 1976 survey included 9,812 persons who received a bachelor's or master's degree in science or engineering between July 1, 1973 and June 30, 1975.¹ Appendix C contains a copy of this questionnaire.

Data from the 1976 *National Survey of Natural Social Scientists and Engineers* (Appendix D), conducted for NSF by the Bureau of the Census, are compared with the recent graduates survey data in a fourth section.² The sample for this survey was drawn from persons who were identified as scientists and engineers in the work force during the 1970 Census of Population. Although there are differences between this and the Westat surveys,³ some of the results can be compared.

DEFINING ENERGY-RELATED SCIENTISTS AND ENGINEERS

One of the questions in the 1978 Westat surveys asked respondents to check the area of critical national interest (if any) to which they devoted a significant proportion of professional time. The question is reproduced in Figure 1. Those who answered this question by checking "energy and fuel" are considered here to be energy-related. Note that the question allows only one choice. Persons working on the environmental or health effects of energy use may have chosen "health" or "environmental protection, pollution control" instead of "energy and fuel." Persons who selected "energy and fuel" may be considered a core group of energy-related workers; the total number of persons whose work involves some aspect of energy is probably much larger.

18. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in the week of August 7, 1978, please check the box for the ONE on which you spent the MOST time.

Energy and fuel	01	<input type="checkbox"/>	Go to 19
Health	02	<input type="checkbox"/>	
Defense	03	<input type="checkbox"/>	
Environmental protection, pollution control	04	<input type="checkbox"/>	
Education	05	<input type="checkbox"/>	
Space	06	<input type="checkbox"/>	
Crime prevention and control	07	<input type="checkbox"/>	
Food and other agricultural products	08	<input type="checkbox"/>	Go to 23
Natural resources, other than fuel or food	09	<input type="checkbox"/>	
Community development and services ..	10	<input type="checkbox"/>	
Housing (planning, design, construction)	11	<input type="checkbox"/>	
Transportation, communications	12	<input type="checkbox"/>	
Cultural life	13	<input type="checkbox"/>	
Other area (Specify):	14	<input type="checkbox"/>	
Does not apply	88	<input type="checkbox"/>	

Figure 1. Question Used to Identify Energy-Related Scientists and Engineers

The question used in the 1976 *National Survey of Natural and Social Scientists and Engineers* differed slightly from the question in Figure 1. The Census question did not require that the choice be based on a specific reference week and did not include the choices of "transportation" or "other." Consequently, one would expect a slightly higher proportion of respondents to be represented in each category of the Census survey than in the Westat survey. The reader should remember this when comparing results from the two surveys.

The question in the 1976 Westat survey also differed slightly from that of 1978. ("Cultural life" was not a choice in 1976, and "education" represented two choices--"teaching" and "other" in that year.) However, these changes should not have made a significant difference in the number of graduates choosing "energy and fuel."

ENERGY-RELATED SCIENTISTS AND ENGINEERS

Recent graduates in science and engineering may be categorized either by employment specialty or by major field of study for the highest degree held. In general, information is given here for both major field of study and occupation, though where more appropriate, only one characterization is used.

Only 1.9 percent and 3.3 percent, respectively, of the 1972 and 1976 graduates indicated that they were unemployed and seeking work. Since the statistics for the employed respondents closely parallel those for the entire sample, the tables in this report represent only employed recent graduates.

MAJOR FIELD OF STUDY

Of the 336,000 employed 1972 graduates in engineering and science, about 7.0 percent indicated that they devoted a significant portion of their professional time to energy-related work during the reference week of August 7, 1978; approximately 8.3 percent of the 316,000 employed 1976 respondents indicated that their work was energy-related. A relatively high proportion of engineers (19.3 percent of the 1972 graduates and 22.1 percent of the 1976 graduates) were involved in energy-related activities. Only 4.0 percent and 5.0 percent, respectively, of the 1972 and 1976 graduates in science indicated energy-relatedness. However, both physical and environmental scientists were significantly involved in energy-related work (Tables 1 and 2).

OCCUPATION

The distribution of energy-related scientists and engineers by occupation is similar to the distribution of energy-related graduates by major field of study. The respondents were asked to define their occupations in terms of the field of their college major. One-third or more of those working in chemical or mechanical engineering and in environmental science, were also working on energy concerns (Tables 3 and 4). Since not all of those surveyed responded to the question on major field and the question on occupation, and since the large or fractional weights used can result in small errors, the totals given by major field of study and by occupation are slightly different.

ENERGY SOURCE

For the first time, energy-related respondents were asked to identify the energy source involved in the largest proportion of their energy-related work during the reference week. Tables 5 and 6 show that for both class years, the highest proportion of scientists and engineers listed petroleum as the major energy source, followed by nuclear sources. Of the 1972 graduates, a higher percentage of scientists (34.4 percent) than engineers (27.4 percent) were involved primarily in petroleum-related projects. In the 1976 sample, the same proportion of scientists as engineers worked on petroleum-related concerns (31 percent).

Tables 7 and 8 indicate that the distribution of work activities is similar for the fossil fuels (coal, petroleum, natural gas). Among 1972 graduates, a slightly higher proportion of those working on petroleum concerns are involved in development than are those working on coal or natural gas. The reverse is true of the proportion of petroleum-related workers in operations. Graduates of 1972 working with nuclear power are more likely to be involved in management activities than are their counterparts working with other energy areas. This is not the case for 1976 graduates.

ENERGY-RELATED ACTIVITY

Tables 9 and 10 indicate all energy-related activities in which the respondents were involved. Respondents were asked to check all activities in which they were involved, and the reader should note that in some cases, this involvement may be minor. Both engineers and scientists were involved in electric power generation, extraction, transportation, and environmental impact activities, though often more engineers than scientists worked in these areas. Engineers also indicated involvement in the manufacture, utilization, and conservation of energy. Scientists who graduated in 1976 also worked on energy utilization and conservation. More scientists than engineers participated in exploration activities (approximately 30 percent of scientists and 7 to 8 percent of engineers).

Tables 11 and 12 indicate the primary energy-related activities in which the respondents were engaged. Nearly 25 percent of the energy-related recent graduates were primarily involved with the extraction, manufacture, or processing of energy. Over 25 percent of the scientists were engaged in

exploration activities, and a noticeable proportion of engineers worked on generation of electricity. Between the 1972 and 1976 graduating classes, involvement in energy conservation increased, mainly due to the increased participation of scientists in this area.

Environmental impact work was listed as a primary activity by only a few respondents. This is not surprising when one remembers that "environmental protection" was also a choice as an area of national concern. As mentioned earlier, it is likely that many persons working on the environmental effects of energy use selected "environmental protection" rather than "energy and fuel" as their area of work.

As Tables 13 and 14 indicate, the highest proportion of persons involved in exploring for energy viewed the major portion of their work as applied research. Most energy-related activities involved the respondents in management, design, or operations activities. Those working on environmental impact reported their major work activities as report and technical writing, basic research, and either consulting (1972 graduates) or quality control (1976 graduates).

Further information on energy-related scientists and engineers can be found in Appendix A, Tables A-1 through A-28.

Table 1. Major Field of Study for Highest Degree Held:
Total Versus Energy-Related 1972 Graduates in 1978

<u>Major</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Percent Energy-Related</u>
Engineering			
Chemical	4,540	1,450	31.9
Civil	9,060	1,390	15.3
Electrical or electronic	17,480	2,540	14.5
Mechanical	10,640	3,350	31.5
Nuclear, petroleum, or mining	2,450	1,610	65.7
Other	20,350	2,130	10.5
Total, engineering	64,520	12,470	19.3
Science			
Physical	16,040	1,740	10.8
Math and computer	27,210	1,370	5.0
Environmental	9,190	1,700	18.5
Life	46,050	1,760	3.8
Psychology and social	124,250	2,260	1.8
Total, science	222,740	8,830	4.0
Other	49,220	2,090	4.2
Total	336,480	23,390	7.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Totals for degree and for occupation may differ slightly since not all respondents answered both questions. Fractional weighting also results in small differences.

Table 2. Major Field of Study for Highest Degree Held:
Total Versus Energy-Related 1976 Graduates in 1978

<u>Major</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Percent Energy-Related</u>
Engineering			
Chemical	4,330	1,840	42.5
Civil	10,460	1,920	18.4
Electrical or electronic	14,470	2,040	14.1
Mechanical	9,300	3,230	34.7
Nuclear, petroleum, or mining	2,530	1,610	63.6
Other	20,210	2,900	14.3
Total, engineering	61,300	13,540	22.1
Science			
Physical	13,870	1,590	11.5
Math and computer	24,630	1,860	7.6
Environmental	9,240	2,270	24.6
Life	66,820	2,490	3.7
Psychology and social	129,090	4,000	3.1
Total, science	243,650	12,210	5.0
Other	10,960	370	3.4
Total	315,910	26,120	8.3

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Totals for degree and for occupation may differ slightly since not all respondents answered both questions. Fractional weighting also results in small differences.

Table 3. Occupation of 1972 Graduates: Total
Versus Energy-Related Graduates in 1978

<u>Occupation</u>	<u>Total</u>	<u>Energy-Related</u>	<u>Percent Energy-Related</u>
Engineering			
Chemical	3,058	980	32.0
Civil	7,483	750	10.0
Electrical or electronic	13,953	1,920	13.8
Mechanical	8,550	3,420	40.0
Nuclear, petroleum, or mining	4,313	3,460	80.3
Other	<u>22,801</u>	<u>3,460</u>	15.2
Total, engineering	60,160	13,990	23.3
Science			
Physical	8,424	1,296	15.4
Math and computer	21,792	1,296	6.0
Environmental	5,014	1,666	33.3
Life	19,830	540	2.7
Psychology and social	25,078	627	2.5
Total, science	80,130	5,440	6.8
Other	<u>194,460</u>	<u>3,880</u>	2.0
Total	334,750	23,310	7.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Totals for degree and for occupation may differ slightly since not all respondents answered both questions. Fractional weighting also results in small differences.

Table 4. Occupation of 1976 Graduates: Total
Versus Energy-Related Graduates in 1978

<u>Occupation</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Percent Energy- Related</u>
Engineering			
Chemical	4,370	1,573	35.9
Civil	8,440	1,484	17.5
Electrical or electronic	13,096	1,892	14.4
Mechanical	10,177	3,820	37.5
Nuclear, petroleum, or mining	4,591	3,261	71.0
Other	<u>20,618</u>	<u>2,992</u>	14.5
Total, engineering	61,300	15,010	24.5
Science			
Physical	10,061	1,807	18.0
Math and computer	22,262	1,431	6.4
Environmental	5,792	1,968	34.0
Life	30,220	640	2.1
Psychology and social	27,773	1,203	4.3
Total, science	96,100	7,050	7.3
Other	<u>156,150</u>	<u>4,050</u>	2.6
Total	313,550	26,110	8.3

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Totals for degree and for occupation may differ slightly since not all respondents answered both questions. Fractional weighting also results in small differences.

Table 5. Major Energy Source Involved in Energy-Related Activities
Versus Occupations of Energy-Related 1972 Graduates in 1978

<u>Major Energy Source</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Coal and coal products	17.1	19.2	11.8
Petroleum ^a	29.4	27.4	34.4
Natural gas	11.6	11.2	12.5
Nuclear (fission and fusion)	20.7	22.8	15.5
Solar	8.0	5.5	14.5
Other	8.7	8.3	9.6
No answer	<u>4.5</u>	<u>5.6</u>	<u>1.5</u>
Total	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aIncludes oil shale and tar sands.

Table 6. Major Energy Source Involved in Energy-Related Activities
Versus Occupations of Energy-Related 1976 Graduates in 1978

<u>Major Energy Source</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Coal and coal products	15.3	16.2	13.3
Petroleum ^a	31.0	31.0	31.0
Natural gas	13.6	15.9	8.6
Nuclear (fission and fusion)	19.9	20.9	17.9
Solar	6.8	6.3	7.7
Other	7.6	6.4	10.3
No answer	<u>5.7</u>	<u>3.2</u>	<u>11.1</u>
Total	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aIncludes oil shale and tar sands.

Table 7. Primary Work Activity Versus Major Energy Source Involved in
Energy-Related Activities: Energy-Related 1972 Graduates in 1978^a

Work Activity	Energy Source					
	Coal, Coal Products (Percent)	Petroleum (Percent)	Natural Gas (Percent)	Nuclear (Percent)	Solar (Percent)	Other (Percent)
Management	18.9	15.2	14.5	28.7	6.6	20.5
Teaching	1.9	1.3	0.0	2.5	14.1	0.0
Basic research	6.2	2.3	1.7	3.6	11.2	7.3
Applied research	7.7	7.4	1.7	13.7	11.7	5.6
Development	4.2	10.2	5.9	7.8	4.3	4.8
Report, technical writing	4.3	3.9	7.2	8.4	2.3	10.3
Design	13.5	9.4	7.4	9.3	12.2	8.8
Quality control	4.4	4.4	9.6	3.5	0.0	3.7
Operations	19.8	8.6	24.6	7.5	18.8	2.3
Distribution	3.7	7.6	10.9	1.7	0.0	4.2
Consulting	6.1	7.4	4.6	0.8	2.3	7.7
Other	<u>9.3</u>	<u>22.3</u>	<u>12.0</u>	<u>12.6</u>	<u>16.5</u>	<u>24.7</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table 8. Primary Work Activity Versus Major Energy Source Involved in
Energy-Related Activities: Energy-Related 1976 Graduates in 1978^a

<u>Work Activity</u>	<u>Energy Source</u>					
	<u>Coal, Coal Products (Percent)</u>	<u>Petroleum (Percent)</u>	<u>Natural Gas (Percent)</u>	<u>Nuclear (Percent)</u>	<u>Solar (Percent)</u>	<u>Other (Percent)</u>
Management	14.2	18.6	10.9	9.5	11.6	11.8
Teaching	1.1	0.7	2.0	3.0	3.1	1.7
Basic research	9.4	4.2	0.7	7.0	16.0	12.0
Applied research	3.9	7.1	5.0	10.4	23.5	14.6
Development	6.1	7.5	4.8	6.8	11.0	7.2
Report, technical writing	8.3	4.4	4.3	10.0	6.1	5.5
Design	11.4	12.6	14.0	10.1	14.7	6.6
Quality control	6.3	4.7	7.3	8.7	6.2	10.1
Operations	19.4	16.9	22.8	13.1	2.4	1.9
Distribution	7.0	5.1	2.9	2.3	0.0	0.7
Consulting	4.8	3.3	1.1	10.6	4.4	4.4
Other	<u>8.0</u>	<u>15.0</u>	<u>24.2</u>	<u>8.5</u>	<u>0.9</u>	<u>23.6</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table 9. All Energy-Related Activities Involved in Occupations of Energy-Related 1972 Graduates in 1978^a

<u>Activity</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Exploration	14.0	7.6	30.2
Extraction	13.0	14.2	10.0
Manufacturing	13.2	16.5	4.9
Fuel processing	8.7	9.8	6.0
Electric power generation	21.7	24.1	15.6
Transportation	14.4	16.3	9.8
Energy storage	5.7	6.6	3.1
Energy utilization, management	16.7	19.9	8.4
Fuel reprocessing or disposal	2.6	2.8	2.0
Conservation	13.3	15.6	7.4
Environmental impact	11.4	11.6	10.9
Education, training	5.0	3.1	9.8
Other	8.3	3.8	19.6

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

^a Respondents were asked to check any activity in which they were involved. Many respondents checked more than one category.

Table 10. All Energy-Related Activities Involved in
Occupations of Energy-Related 1976 Graduates in 1978^a

<u>Activity</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Exploration	15.3	8.4	30.1
Extraction	12.3	11.8	13.3
Manufacturing	12.9	15.6	7.0
Fuel processing	9.7	9.5	10.2
Electric power generation	17.6	21.6	8.9
Transportation of energy	11.8	14.1	6.9
Energy storage	4.4	3.7	5.8
Energy utilization, management	14.7	15.4	13.1
Fuel reprocessing or disposal	4.2	5.0	2.6
Conservation	18.4	19.4	16.1
Environmental impact	11.3	10.7	12.4
Education, training	4.3	3.2	6.7
Other	8.1	4.3	16.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

^a Respondents were asked to check any activity in which they were involved. Many respondents checked more than one category.

Table 11. Major Energy-Related Activity Involved in
Occupations of Energy-Related 1972 Graduates in 1978

<u>Energy-Related Activity</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Exploration	10.3	3.0	28.9
Extraction	8.1	9.8	3.7
Manufacturing and processing	15.6	18.6	7.7
Electric power generation	12.5	14.0	8.8
Transportation and storage	8.7	10.2	4.9
Conservation	7.0	8.4	3.4
Environmental impact	3.7	2.7	6.3
Other	17.5	14.8	24.2
No answer	<u>16.6</u>	<u>18.5</u>	<u>12.0</u>
Total	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 12. Major Energy-Related Activity Involved in
Occupations of Energy-Related 1976 Graduates in 1978

<u>Energy-Related Activity</u>	<u>Scientists and Engineers (Percent)</u>	<u>Engineers (Percent)</u>	<u>Scientists (Percent)</u>
Exploration	11.6	5.2	25.3
Extraction	7.3	8.6	4.5
Manufacturing and processing	15.4	18.1	9.4
Electric power generation	11.3	15.0	3.6
Transportation and storage	7.8	9.0	5.2
Conservation	10.1	10.2	10.0
Environmental impact	5.8	4.8	7.8
Other	15.5	13.0	20.8
No answer	<u>15.3</u>	<u>16.2</u>	<u>13.2</u>
Total	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 13. Primary Work Activity Versus Major Energy-Related
Activity: Energy-Related 1972 Graduates in 1978^d

Work Activity	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Management	8.8	23.2	16.8	20.5	20.0	27.7	8.7	18.3
Teaching	0.0	0.8	0.8	0.0	0.0	11.1	0.0	6.5
Basic research	5.0	3.7	1.7	5.0	1.4	6.3	12.1	8.1
Applied research	24.6	6.0	2.9	5.7	4.9	0.9	7.3	13.1
Development	9.8	9.7	11.1	4.0	0.7	12.2	2.9	4.5
Report, technical writing	3.9	1.1	7.7	9.4	4.4	5.0	28.2	2.2
Design	0.0	17.5	16.6	13.7	18.1	7.4	1.3	6.9
Quality control	5.8	1.8	6.5	9.5	10.9	4.9	2.3	0.0
Operations	9.7	23.3	17.8	19.1	19.1	7.8	6.2	4.5
Distribution	0.0	5.3	10.5	2.4	0.0	2.7	2.4	7.7
Consulting	5.4	5.4	0.9	3.3	18.2	9.3	19.8	3.0
Other	<u>26.9</u>	<u>2.1</u>	<u>6.8</u>	<u>7.7</u>	<u>2.3</u>	<u>4.7</u>	<u>9.0</u>	<u>25.4</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^dDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table 14. Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a

Work Activity	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage * (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Management	9.7	7.6	8.3	18.0	8.7	10.0	0.9	15.9
Teaching	2.0	0.0	1.1	0.4	0.0	2.3	4.0	3.8
Basic research	8.5	2.0	9.2	5.8	3.0	9.1	13.4	6.7
Applied research	17.3	8.1	4.3	6.2	7.8	11.5	9.6	11.2
Development	9.7	8.3	14.7	4.3	1.2	6.4	0.6	7.1
Report, technical writing	8.3	5.5	2.7	8.7	3.9	6.0	26.4	8.9
Design	3.4	9.1	19.7	18.6	21.9	15.6	4.2	7.9
Quality control	8.8	5.9	8.9	12.2	1.8	1.4	10.3	8.6
Operations	11.9	36.8	16.6	16.5	22.8	8.9	5.4	5.8
Distribution	3.4	0.7	8.6	0.4	8.3	4.4	7.7	1.0
Consulting	1.6	1.2	0.8	3.9	3.8	3.4	6.4	4.4
Other	<u>15.3</u>	<u>14.9</u>	<u>5.2</u>	<u>5.1</u>	<u>16.7</u>	<u>17.2</u>	<u>4.6</u>	<u>11.6</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

TOTAL POPULATION AND ENERGY-RELATED NEW ENTRANTS

MAJOR FIELD OF STUDY VERSUS OCCUPATION

As Table 15 illustrates, more engineers than scientists were employed in the same field as their college major. On the whole, energy-related scientists and engineers were more often employed in their major field than was the total population of science and engineering graduates. Differences between the total and energy-related populations were most pronounced among 1972 science graduates, and least pronounced among the 1976 engineering graduates. A more detailed comparison of major field of study and occupation for energy-related graduates can be found in Appendix A, Tables A-27 and A-28.

Table 16 compares college major with occupation for bachelor's and master's recipients. Predictably, scientists with master's degrees are more likely than those with bachelor's degrees to be employed in the field of their college major. However, engineers with master's degrees are only slightly more likely to hold engineering jobs than their bachelor's-level counterparts.

EDUCATIONAL ATTAINMENT BY MAJOR

Tables 17 and 18 show that energy-related scientists and engineers are more likely to have advanced degrees than the total group of respondents. Of the energy-related group, 47.3 percent held a master's or higher degree of the 1972 graduates, and 31.4 percent of the 1976 graduates. Of all the scientists and engineers surveyed, 41.9 percent held a master's or higher degree among 1972 graduates, and 25.1 percent of 1976 graduates held advanced degrees.

Energy-related scientists account for the major portion of this difference. Of all science majors who graduated in 1972, 29.8 percent earned master's or higher degrees, while this was true of 43.7 percent of the energy-related scientists. Of 1976 graduates, 19.2 percent of all science majors and 26.7 percent of energy-related science majors held degrees higher than a bachelor's. Predictably, a higher proportion of 1972 graduates than of 1976 graduates have earned advanced degrees.

EDUCATIONAL ATTAINMENT BY OCCUPATION

Differences in educational attainment are also evident between the energy-related and the total population of new entrants into the work force

when they are classified by occupation. On the whole, energy-related respondents seem slightly more likely to hold advanced degrees, especially those working as scientists (Tables 19 and 20).

RACE

Although the proportion of non-whites who majored in science and engineering increased from 5.1 percent of the 1972 graduates to 6.6 percent of the 1976 graduates, the proportion of non-whites who indicated that they were working on energy-related problems declined (Table 21). Engineers account for the majority of the fluctuation. Among those who graduated in 1972, 5.5 percent of all engineering graduates were non-white and 7.6 percent of energy-related engineering graduates were non-white. For the class of 1976, the respective figures were 7.6 percent and 4.4 percent.

By occupation, 5.5 percent of all employed 1972 scientists and engineers were non-white, as were 6.9 percent of the energy-related scientists and engineers. For 1976, 7.1 percent of the total, and 4.4 percent of the energy-related group were non-white. This suggests that non-whites are more likely to work in energy-related areas as they gain experience--especially non-white engineers.

SEX

A higher percentage of the graduates in science and engineering in 1976 (29.2 percent) were female than in 1972 (21.6 percent) (Table 22). The proportion of energy-related females also rose between 1972 and 1976. However, the representation of women in the energy-related group remained comparatively small (6.0 percent of 1972 graduates, and 13.5 percent of 1976 graduates). One finds similar results in the distribution of females by occupation. Although 14.5 percent of the class of 1972 scientists and engineers and 22.2 percent of the class of 1976 scientists and engineers were female, the figures for the energy-related group were 5.8 percent and 9.6 percent, respectively.

Most of this difference can be attributed to the small proportion of energy-related female scientists. Since 82 percent of all female scientists who graduated in 1972, and 85 percent of those who graduated in 1976 held degrees in either the life or social sciences, these results are reasonable. Few life or social scientists are involved in energy-related activities.

TYPE OF EMPLOYER

Most of the engineers and a sizable number of the scientists surveyed were employed by private industry. Among the energy-related, an even larger proportion of engineers (87.2 percent of 1972 graduates; 82.9 percent of 1976 graduates) and scientists (70.6 percent of 1972 graduates; 59.3 percent of 1976 graduates) worked for private industry (Tables 23 and 24). Educational institutions employed the second largest proportion of 1976 energy-related science and engineering graduates. Of the 1972 graduates, the second largest group of energy-related scientists worked in educational institutions, but more engineers were employed in the federal government than in education. Type of employer is shown separately for bachelor's and master's recipients in Appendix A, Tables A-29 and A-30.

PRIMARY WORK ACTIVITY

More of the energy-related scientists and engineers listed applied research, design, and operations as their primary work activity than the total population of scientists and engineers (Tables 25 and 26). These activities are common among engineers, who make up a much larger proportion of the energy-related group than of the total population. Slightly more of the energy-related scientists than total scientists indicated basic research as their primary work activity, and fewer energy-related than total scientists were involved in management or teaching activities. Energy-related engineers were as likely to be involved in management as all other engineers and less likely to be involved in development. Differences between energy-related and total engineers are less pronounced than between energy-related and total scientists.

Since the 1972 graduates have been in the work force longer than the 1976 graduates, one might expect to find a larger group of 1972 graduates in management positions. Tables 19 and 20 show this to be the case. Of all scientists and engineers who graduated in 1972, 16.9 percent and 17.7 percent of the energy-related responded that management was their primary work activity. Of the 1976 graduates, 11.0 percent and 11.8 percent of the total and energy-related groups were primarily involved in management. Tables A-31 through A-34 in Appendix A also show the predictable results that engineers with master's degrees are more likely than bachelor's-level graduates to hold management positions, and less likely to work in design,

quality control, or operations. Except for the energy-related 1972 graduates, master's-level scientists were no more likely than their bachelor's-level counterparts to hold management positions. Instead, more of the scientists with master's degrees were involved in teaching activities or research.

TYPE OF EMPLOYMENT

Tables 27 and 28 indicate the type of employment held by the energy-related and total employed respondents. Findings here support the results in Table 9—that the energy-related are much more likely than the total population of scientists and engineers to be employed in a field related to their college majors. Tables A-35 through A-38 in Appendix A show these results in more detail.

MEDIAN SALARY

For all scientists and engineers who graduated in 1972, the median annual salary was \$17,000 (Table 29), and for the 1976 graduates, \$12,500 (Table 30). Median annual salaries for energy-related scientists and engineers were 29 percent and 40 percent higher for 1972 and 1976 graduates, respectively. Energy-related engineers of both classes reported salaries 3 to 5 percent higher than all engineers, and energy-related scientists reported salaries approximately 25 percent higher than salaries for all scientists. Among the energy-related 1972 graduates, mechanical engineers and nuclear, petroleum, and mining engineers reported the highest salaries. Chemical, nuclear, petroleum, and mining engineers earned the highest salaries among 1976 graduates. Of the energy-related scientists, the environmental scientists reported the highest median salaries.

Of the 1972 science and engineering graduates, the largest differences between the energy-related and total populations are found between social scientists (a difference of 33 percent by both occupation and degree) and between environmental scientists (35 percent by college major, 15 percent by occupation). The same is true of 1976 science and engineering graduates. Energy-related environmental scientists reported median salaries 35 to 40 percent higher than the total population of environmental scientists who graduated in 1976. By occupation, energy-related social scientists earned 42 percent more than all social scientists of the 1976 class.

In contrast, energy-related electrical or electronic engineers of both classes reported median salaries the same or slightly lower than the salaries

reported by all electrical or electronic engineers. For the 1976 graduates, this applies also to mechanical engineers. Separate salary information for bachelor's and master's recipients is contained in Tables A-39 through A-42.

Table 15. Comparison of Major Field of Study for Highest Degree Held
and Occupation: Total Versus Energy-Related Graduates in 1978

<u>Major</u>	<u>Total</u>		<u>Percentage with Occupation Same as College Major</u>	
	<u>1972 Graduates (Thousands)</u>	<u>1976 Graduates (Thousands)</u>	<u>1972 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>
Science and engineering				
Total	287	305	42.5	46.7
Energy-related	21	26	75.4	73.4
Engineering				
Total	65	61	76.2	82.8
Energy-related	12	12	89.6	91.6
Science				
Total	223	244	32.7	37.6
Energy-related	9	14	55.2	53.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: In this table, the science and engineering fields are not subdivided
into specialty areas. All graduates are included if their occupation
is in the same major field (either science or engineering) in which
they hold their highest degree.

Table 16. Comparison of Major Field of Study for Highest Degree
Held and Occupation: Masters Versus Bachelors in 1978

<u>Major</u>	Percent with Occupation Same as College Major			
	1972 Graduates		1976 Graduates	
	<u>Bachelors</u> (Percent)	<u>Masters</u> (Percent)	<u>Bachelors</u> (Percent)	<u>Masters</u> (Percent)
Science and engineering				
Total	30.5	63.0	38.9	72.8
Energy-related	69.8	81.3	67.2	83.3
Engineering				
Total	74.0	78.8	82.4	83.4
Energy-related	90.0	89.0	90.4	94.0
Science				
Total	19.6	55.7	30.1	67.9
Energy-related	39.9	70.0	44.0	77.5

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: In this table, the science and engineering fields are not subdivided
into specialty areas. All graduates are included if their occupation
is in the same major field (either science or engineering) in which
they hold their highest degree.

Table 17. Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1972 Graduates in 1978

Major	Total			Energy-Related		
	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)
Engineering						
Chemical	65.9	27.4	6.7	60.2	32.8	7.0
Civil	64.1	32.9	3.0	46.2	46.0	7.9
Electrical or electronic	59.4	28.2	2.4	69.7	26.8	3.5
Mechanical	64.6	32.7	2.7	60.3	34.7	5.0
Nuclear, petroleum, or mining	41.8	49.0	9.2	41.9	47.4	10.7
Other	59.1	37.4	3.5	64.0	26.1	9.9
Total, engineering	60.6	36.0	3.4	58.9	34.3	6.8
Science						
Physical	51.3	32.1	16.6	23.6	44.2	32.2
Math and computer	60.0	35.5	4.4	46.7	49.3	4.0
Environmental	58.4	32.2	9.4	40.4	49.6	10.0
Life	70.0	21.6	8.3	71.6	23.5	4.9
Psychology and social	75.9	17.9	6.1	87.8	9.9	2.3
Total, science	70.3	22.5	7.3	56.4	33.2	10.5
Other	0.0	69.0	31.0	0.0	82.3	17.7
Total	58.1	31.9	10.0	52.7	38.1	9.2

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 18. Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1976 Graduates in 1978

Major	Total			Energy-Related		
	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)
Engineering						
Chemical	64.7	33.2	2.1	59.8	37.8	2.4
Civil	70.6	29.2	0.2	66.2	33.1	0.7
Electrical or electronic	63.3	32.6	0.5	69.5	30.5	0.0
Mechanical	70.1	29.5	0.4	75.8	24.2	0.0
Nuclear, petroleum, or mining	47.0	47.0	6.1	41.5	55.0	3.5
Other	64.1	35.5	0.3	71.0	28.7	0.2
Total, engineering	65.3	34.0	0.7	66.2	32.9	0.9
Science						
Physical	71.9	26.4	1.7	57.1	36.0	6.9
Math and computer	69.3	29.6	1.1	77.9	20.7	1.3
Environmental	72.2	27.2	0.6	56.9	42.0	1.1
Life	84.3	15.0	0.8	83.4	16.6	0.0
Psychology and social	82.7	16.4	0.9	80.5	19.5	0.0
Total, science	80.8	18.3	0.9	73.3	25.4	1.3
Other	0.0	85.7	14.3	0.0	96.2	3.8
Total	75.0	23.7	1.4	68.6	30.3	1.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

Table 19. Educational Attainment by Occupation:
Total Versus Energy-Related 1972 Graduates in 1978

<u>Occupation</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>
Engineering						
Chemical	54.5	33.9	11.6	48.3	45.3	6.4
Civil	65.2	32.4	2.3	42.6	52.0	5.4
Electrical or electronic	54.3	43.4	2.3	63.9	32.3	3.8
Mechanical	58.5	37.8	3.6	47.0	48.0	5.0
Nuclear, petroleum, or mining	56.5	35.5	8.0	58.3	33.7	8.1
Other	59.8	36.5	3.7	64.9	30.3	4.8
Total, engineering	58.5	37.6	3.9	56.5	37.8	5.7
Science						
Physical	35.5	37.0	27.5	22.7	34.8	42.5
Math and computer	53.4	41.4	5.2	59.8	36.4	3.9
Environmental	34.0	41.8	24.2	37.4	50.7	11.8
Life	50.3	31.0	18.7	19.2	67.0	13.8
Psychology and social	24.3	51.1	24.7	62.8	32.8	4.4
Total, science	40.4	41.4	18.2	40.4	43.0	16.6
Other	65.3	26.1	8.6	53.7	35.0	11.2
Total	58.1	31.8	10.1	52.2	38.6	9.2

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 20. Educational Attainment by Occupation:
Total Versus Energy-Related 1976 Graduates in 1978

<u>Occupation</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>
Engineering						
Chemical	67.8	30.4	1.8	59.9	38.0	2.1
Civil	69.1	30.9	0.0	62.8	37.2	0.0
Electrical or electronic	63.8	35.6	0.6	63.5	36.5	0.0
Mechanical	70.7	29.0	0.4	79.2	20.5	0.3
Nuclear, petroleum, or mining	69.7	27.0	3.3	66.3	31.2	2.5
Other	66.8	32.7	0.5	66.1	33.7	0.2
Total, engineering	67.4	31.9	0.8	68.2	30.9	0.9
Science						
Physical	68.0	29.8	2.2	63.5	30.4	6.0
Math and computer	62.4	36.8	0.8	70.4	27.9	1.7
Environmental	60.4	38.3	1.2	51.8	47.0	1.3
Life	73.4	25.0	1.7	55.8	44.2	0.0
Psychology and social	50.9	44.2	4.9	49.3	50.7	0.0
Total, science	63.0	34.6	2.4	58.5	39.2	2.2
Other	85.2	13.8	1.0	87.6	12.4	0.0
Total	74.9	23.7	1.4	68.6	30.3	1.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 21. Percentage Non-White: Total
Versus Energy-Related Graduates in 1978

<u>Major</u>	<u>Total</u>		<u>Energy-Related</u>	
	<u>1972 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>	<u>1972 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>
Science and engineering	5.1	6.6	6.5	4.9
Engineering	5.5	7.6	7.6	4.4
Science	5.0	6.3	5.0	5.4
<u>Occupation</u>				
Science and engineering	5.5	7.1	6.9	4.4
Engineering	5.3	7.2	8.1	4.1
Science	5.6	7.1	3.9	4.9

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

Table 22. Percentage Female: Total
Versus Energy-Related Graduates in 1978

<u>Major</u>	<u>Total</u>		<u>Energy-Related</u>	
	<u>1972 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>	<u>1972 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>
Science and engineering	21.6	29.2	6.0	13.5
Engineering	1.0	3.7	0.8	4.3
Science	27.6	35.6	13.3	23.7
<u>Occupation</u>				
Science and engineering	14.5	22.2	5.8	9.6
Engineering	2.7	6.2	2.1	5.5
Science	23.4	32.4	15.1	18.3

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

Table 23. Type of Employer by Occupation: Total
Versus Energy-Related 1972 Graduates in 1978

<u>Type of Employer</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>
Private industry	53.3	82.5	75.5	87.2	36.6	70.6
Educational institution	18.7	5.3	2.7	1.4	30.8	15.0
Federal government	10.2	5.9	9.5	4.9	10.7	8.5
State and local government	8.7	2.1	6.2	1.6	10.6	3.4
Non-profit organization	2.6	2.7	1.6	3.0	3.4	2.0
Other	5.5	0.8	3.1	1.1	7.5	0.0
No answer	<u>0.9</u>	<u>0.7</u>	<u>1.3</u>	<u>0.7</u>	<u>0.5</u>	<u>0.5</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 24. Type of Employer by Occupation: Total
Versus Energy-Related 1976 Graduates in 1978

<u>Type of Employer</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>
Private industry	51.9	75.4	77.7	82.9	35.5	59.3
Educational institution	18.9	12.6	5.4	7.8	27.5	22.9
Federal government	7.9	5.7	7.7	5.0	8.0	7.0
State and local government	8.9	1.7	4.4	0.3	11.9	4.8
Non-profit organization	3.9	1.9	0.7	1.1	5.9	3.6
Other	7.5	0.6	3.0	0.5	10.4	1.1
No answer	<u>0.9</u>	<u>2.1</u>	<u>1.0</u>	<u>2.5</u>	<u>0.8</u>	<u>2.3</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 25. Primary Work Activity by Occupation: Total
Versus Energy-Related 1972 Graduates in 1978

<u>Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>
Management	16.9	17.7	21.9	21.3	13.2	8.5
Teaching	8.1	2.2	1.6	1.7	13.1	3.3
Basic research	7.6	5.1	1.0	1.5	12.6	14.5
Applied research	6.6	9.0	4.0	6.8	8.6	14.7
Development	8.8	8.1	14.2	9.4	4.6	5.0
Report, technical writing	5.7	6.0	6.0	5.6	5.5	7.1
Design	7.1	12.6	15.3	17.1	1.0	1.1
Quality control	4.8	5.3	6.2	5.1	3.8	6.0
Operations	8.9	11.5	16.0	15.1	3.6	2.4
Distribution	2.0	1.7	1.7	2.4	2.2	0.0
Consulting	3.9	6.1	4.4	5.7	3.5	7.1
Other	18.6	14.6	7.1	8.4	27.2	30.2
No answer	<u>0.9</u>	<u>0.0</u>	<u>0.6</u>	<u>0.0</u>	<u>1.0</u>	<u>0.0</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 26. Primary Work Activity by Occupation: Total
Versus Energy-Related 1976 Graduates in 1978

<u>Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>
Management	11.0	11.8	12.3	14.5	10.3	6.2
Teaching	6.6	1.5	1.0	0.7	10.3	3.3
Basic research	9.4	7.3	1.9	2.5	14.2	17.3
Applied research	7.5	10.6	4.7	5.4	9.3	21.8
Development	7.9	8.0	13.7	9.1	4.3	5.7
Report, technical writing	8.1	6.4	8.3	7.0	8.0	5.1
Design	8.0	13.8	18.0	19.3	1.6	2.1
Quality control	7.2	6.8	9.8	7.6	5.5	5.1
Operations	9.9	14.3	17.1	20.4	5.2	1.5
Distribution	2.1	2.1	1.1	2.2	2.7	1.9
Consulting	2.6	3.6	3.7	4.8	1.9	1.1
Other	18.6	13.5	7.7	6.5	25.6	28.6
No answer	<u>1.0</u>	<u>0.2</u>	<u>0.6</u>	<u>0.1</u>	<u>1.3</u>	<u>0.3</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 27. Employment Status: Total Versus
Energy-Related 1972 Graduates in 1978

<u>Employment</u>	<u>Total (Percent)</u>	<u>Energy-Related (Percent)</u>
Full-time, science or engineering	38.2	79.5
Full-time, non-science, non-engineering	53.2	17.8
Part-time	6.5	2.1
Postdoctoral	<u>2.0</u>	<u>0.6</u>
Total	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1973 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 28. Employment Status: Total Versus
Energy-Related 1976 Graduates in 1978

<u>Employment</u>	<u>Total (Percent)</u>	<u>Energy-Related (Percent)</u>
Full-time, science or engineering	42.6	75.7
Full-time, non-science, non-engineering	43.3	13.7
Part-time	13.4	10.0
Postdoctoral	<u>0.7</u>	<u>0.6</u>
Total	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 29. Median Salary: Total Versus Energy-Related 1972 Graduates in 1978

<u>Field</u>	<u>Occupation</u>			<u>Major</u>		
	<u>Total</u> (Dollars)	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>	<u>Total</u> (Dollars)	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>
Engineering						
Chemical	22,000	22,500	1.02	22,000	23,000	1.05
Civil	20,000	23,200	1.16	20,300	23,500	1.16
Electrical or electronic	22,800	22,000	0.96	22,500	22,000	0.98
Mechanical	22,000	24,000	1.09	22,000	23,000	1.05
Nuclear, petroleum, or mining	23,400	24,000	1.03	23,000	26,000	1.13
Other	20,300	20,100	0.99	21,000	20,600	0.98
Total, engineering	21,500	22,500	1.05	21,900	22,600	1.03
Science						
Physical	17,100	21,600	1.26	17,000	20,000	1.18
Math and computer	19,600	20,000	1.02	18,300	20,300	1.11
Environmental	20,000	23,000	1.15	17,000	23,000	1.35
Life	15,500	15,900	1.03	15,000	17,000	1.13
Psychology and social	16,500	22,000	1.33	15,000	20,000	1.33
Total, science	17,200	21,000	1.22	15,500	20,000	1.29
Other	15,000	21,000	1.40	15,700	23,000	1.46
Total	17,000	22,000	1.29	17,000	22,000	1.29

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: All figures have been rounded to the nearest hundred. Salaries for respondents academically employed for 9 to 10 months have been adjusted by a factor of 11/9.

Table 30. Median Salary: Total Versus Energy-Related 1976 Graduates in 1978

<u>Field</u>	<u>Occupation</u>			<u>Major</u>		
	<u>Total</u> (Dollars)	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>	<u>Total</u> (Dollars)	<u>Energy-Related</u>	<u>Ratio of Energy-Related to Total</u>
Engineering						
Chemical	19,000	20,000	1.05	20,000	20,700	1.04
Civil	16,800	18,000	1.07	16,900	19,000	1.12
Electrical or electronic	18,000	18,000	1.00	18,000	18,000	1.00
Mechanical	18,000	18,000	1.00	18,200	18,300	1.01
Nuclear, petroleum, or mining	18,300	19,500	1.07	19,000	20,000	1.05
Other	17,000	18,200	1.07	17,000	18,500	1.09
Total, engineering	17,700	18,400	1.04	18,000	18,800	1.04
41 Science						
Physical	12,000	14,000	1.17	12,000	14,000	1.17
Math and computer	16,000	17,000	1.06	15,300	16,800	1.10
Environmental	13,500	18,200	1.35	13,000	18,200	1.40
Life	10,400	10,000	0.96	11,000	12,000	1.09
Psychology and social	11,000	15,600	1.42	11,000	12,000	1.09
Total, science	12,000	15,000	1.25	11,500	14,400	1.25
Other	11,500	13,000	1.04	15,000	17,600	1.17
Total	12,500	17,500	1.40	12,500	17,500	1.41

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: All figures have been rounded to the nearest hundred. Salaries for respondents academically employed for 9 to 10 months have been adjusted by a factor of 11/9.

COMPARISON OF 1976 AND 1978 SURVEYS OF RECENT GRADUATES

In 1976, Westat conducted an earlier version of the 1978 survey just discussed.⁴ Though the sampling techniques used differed slightly between these two surveys, the 1976 graduates who responded to the *1978 National Survey of Recent Science and Engineering Graduates* should be roughly comparable to the 1974-75 graduates sampled in the 1976 survey. Both groups were surveyed one or two years after graduation. Respondents to the 1978 survey who graduated in 1972 had been in the work force longer and accumulated more experience. (Approximately 65 percent of 1972 graduates reported five or more years of professional experience, while 65 percent of 1976 graduates reported less than three years experience.) Differences between the responses of 1976 and 1974-75 graduates should indicate differences in the opportunities for new scientists and engineers between 1976 and 1978. The 1972 graduates, when compared with the other two groups, should indicate how employment opportunities may change as the new scientists and engineers gain experience.

MAJOR FIELD AND OCCUPATION

Fewer of the 1974-75 graduates responded that their work was energy-related than did graduates of either 1972 or 1976 (Tables 31 and 32). This probably reflects increased national attention to energy issues between 1976 and 1978, when the surveys were taken. The attention may have increased opportunities in energy-related projects. Alternatively, it may mean that people in 1978 were more aware of the connections between their jobs and energy concerns than they were in 1976.

The 1976 survey indicated a strong demand for engineers; 81.1 percent of all engineering graduates surveyed in that year had found employment in engineering. An even higher proportion of the energy-related engineering graduates were employed as engineers (Table 33). Demand for science graduates was not as strong, and only 40.0 percent of the 1974-75 science graduates held jobs in science. However, 55.5 percent of the energy-related science graduates were employed as scientists.

The results from the 1978 survey of 1972 and 1976 graduates were strikingly similar. Of the 1972 engineering graduates, 76.2 percent of the total, and 89.6 percent of the energy-related were employed as engineers. Of the 1976 engineering graduates, 82.8 percent of the total, and 91.6 percent of the energy-related graduates were working as engineers. Among

the science graduates, 32.7 percent of the total population and 55.2 percent of the energy-related population worked in some branch of science. For 1976 science graduates, the respective figures were 37.6 percent and 53.1 percent.

EDUCATIONAL ATTAINMENT

Table 34 indicates educational attainment by major field of study for total and energy-related 1972 graduates. Tables 35 and 36 list the same information for 1974-75 and 1976 graduates, respectively. In Tables 37, 38 and 39, information is given on educational attainment by occupation for each respective class. By major field of study, the pattern of educational attainment, both for the energy-related and for the total number of scientists and engineers, changed little between the 1974-75 and 1976 graduates (Tables 35 and 36). For both years, the level of educational attainment among engineers was not significantly different between total and energy-related groups. Energy-related science majors were still more likely than all scientists of the same class year to hold advanced degrees. However, the proportion of energy-related science majors with a master's degree or higher declined from 34.0 percent among 1974-75 graduates to 26.7 percent among 1976 graduates, while nearly the same percentage of all science majors earned higher degrees. Occupationally, the same relative number of energy-related scientists held advanced degrees of the 1976 and 1974-75 graduates (Tables 38 and 39). But the percentage of all scientists with degrees above the bachelor's level increased in 1976 and approached the proportion of energy-related scientists with advanced degrees.

Graduates of 1972 have had more time in which to earn additional degrees, and have used the opportunity (Tables 34 and 37). Approximately 40 percent of 1972 engineering majors (total and energy-related) held master's degrees or higher, as opposed to 31 percent to 35 percent (Tables 36 and 37) among the later graduates. Of all 1972 science majors, 29.8 percent held advanced degrees, as well as 43.7 percent of the energy-related science majors. By occupation, an even higher proportion of 1972 scientists held degrees beyond the bachelor's: 59.6 percent of the total, and 59.6 percent of the energy-related.

RACE

In all categories, the percentage of non-white scientists and engineers increased in the 1976 class over the percentages for the two earlier classes (Table 40). For the total sample, the increase was most noticeable among engineering majors. The changes in the proportion of non-white energy-related scientists and engineers are somewhat puzzling. It may be helpful here to consider that the 1972 and 1976 graduates were surveyed in 1978, while the 1974-75 graduates were surveyed in 1976. The larger sample size, and larger number of energy-related respondents in the 1978 survey than in the earlier survey, could account for this difference. Alternatively, Table 34 may indicate that non-whites with a recent degree in science or engineering were more likely in 1978 than in 1976 to be employed in energy-related projects. Figures for 1972 graduates might indicate further that more experienced non-whites are even more likely than recent graduates to work on energy problems.

The apparent increase in energy-related non-whites between the 1976 and 1978 surveys may also reflect the way people view their jobs. As discussed earlier, people may have been more likely to consider themselves energy-related in 1978 than in 1976 due to increased national awareness of energy problems. If such a change in perceptions has occurred, the difference in the proportion of energy-related non-whites between the 1976 and 1978 surveys may not be as large as it appears.

SEX

From 21.6 percent in 1972, the proportion of women graduating in science and engineering increased to 29.2 percent of the 1976 class (Table 41). However, nearly all of these women majored in science. The percentage of female engineers (though small) was roughly the same or higher for energy-related graduates than for all graduates in each survey group. But a smaller proportion of women scientists were represented in the energy-related group than in the total number of scientists. This may be explained by the fact that 85 percent of all female scientists in the class of 1976, and 82 percent of the female scientists in the class of 1972 held degrees in life or social sciences. Only a small proportion of graduates in these fields are involved with energy problems (Table 31).

TYPE OF EMPLOYER

Private industry consistently employed the majority of scientists and engineers in all three groups surveyed (Tables 42 through 44). In all groups an even larger proportion of energy-related than total respondents worked for private industry. The difference between energy-related and total scientists was the most dramatic: the 60-70 percent of energy-related scientists in private industry was nearly double the proportion of all scientists working for private firms. Educational institutions employed a larger proportion of all scientists than of energy-related scientists, especially among 1972 graduates, and a much higher percentage of scientists than of engineers.

PRIMARY WORK ACTIVITY

In general, energy-related respondents, especially engineers, were more likely than all respondents to be involved in applied research, design, and operations (Tables 45 through 47). Energy-related scientists were less likely to be involved in teaching activities than all other scientists. Among 1972 and 1976 graduates, all scientists were less likely than energy-related scientists to be active in basic research. Engineers who graduated in 1972 were much more likely than engineers from later classes to hold management positions. This was not true for the corresponding group of scientists.

Table 31. Comparison of 1978 and 1976 Survey: Percent Energy-Related Versus Major Field of Study for Highest Degree Held

<u>Major</u>	<u>1978 Survey</u>		<u>1976 Survey</u>
	<u>1972</u> <u>Graduates</u> <u>(Percent)</u>	<u>1976</u> <u>Graduates</u> <u>(Percent)</u>	<u>1974-75</u> <u>Graduates</u> <u>(Percent)</u>
Engineering			
Chemical	31.9	42.5	23.2
Civil	15.3	18.4	16.6
Electrical or electronic	14.5	14.1	14.3
Mechanical	31.5	34.7	24.5
Other	16.4	19.8	15.5
Total, engineering	19.3	22.1	17.5
Science			
Physical	10.8	11.5	4.3
Environmental	18.5	24.6	16.8
Other	2.7	3.8	1.3
Total, science	4.0	5.0	1.8
Other	4.2	3.4	0.4
Total	7.0	8.3	4.6

Source: 1976 Survey: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147; and 1978 Survey: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

Table 32. Comparison of 1978 and 1976 Survey:
Percent Energy-Related Versus Occupation

<u>Occupation</u>	<u>1978 Survey</u>		<u>1976 Survey</u>
	<u>1972</u> <u>Graduates</u> <u>(Percent)</u>	<u>1976</u> <u>Graduates</u> <u>(Percent)</u>	<u>1974-75</u> <u>Graduates</u> <u>(Percent)</u>
Engineering			
Chemical	32.0	35.9	29.0
Civil	10.0	17.5	17.1
Electrical or electronic	13.8	14.4	18.5
Mechanical	40.0	37.5	31.4
Other	25.5	24.8	18.8
Total, engineering	23.3	24.5	21.0
Science			
Physical	15.4	18.0	6.5
Environmental	33.2	34.0	26.6
Other	3.7	4.1	2.0
Total, science	6.8	7.3	3.4
Other	2.0	2.6	1.4
Total	7.0	8.3	4.6

Source: 1976 Survey: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147; and 1978 Survey: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

Table 33. Comparison of Major Field of Study for Highest Degree
Held and Occupation: Total Versus Energy-Related Graduates

<u>Major</u>	Percent with Occupation Same as College Major		
	1972 Graduates in 1978 (Percent)	1974-75 Graduates in 1976 (Percent)	1976 Graduates in 1978 (Percent)
Science and engineering			
Total	42.5	48.9	46.7
Energy-related	75.4	79.9	73.4
Engineering			
Total	76.2	81.1	82.8
Energy-related	89.6	91.1	91.6
Science			
Total	32.7	40.0	37.6
Energy-related	55.2	55.5	53.1

Source: 1974-75 Graduates column from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: In this table, the science and engineering fields are not subdivided into specialty areas. All graduates are included if their occupation is in the same major field (either science or engineering) in which they hold their highest degree.

Table 34. Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1972 Graduates in 1978

<u>Major</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>
Engineering						
Chemical	65.9	27.4	6.7	60.2	32.8	7.0
Civil	64.1	32.9	3.0	46.2	46.0	7.9
Electrical or electronic	59.4	28.2	2.4	69.7	26.8	3.5
Mechanical	64.6	32.7	2.7	60.3	34.7	5.0
Nuclear, petroleum, or mining	41.8	49.0	9.2	41.9	47.4	10.7
Other	59.1	37.4	3.5	64.0	26.1	9.9
Total, engineering	60.6	36.0	3.4	58.9	34.3	6.8
Science						
Physical	51.3	32.1	16.6	23.6	44.2	32.2
Math and computer	60.0	35.5	4.4	46.7	49.3	4.0
Environmental	58.4	32.2	9.4	40.4	49.6	10.0
Life	70.0	21.6	8.3	71.6	23.5	4.9
Psychology and social	75.9	17.9	6.1	87.8	9.9	2.3
Total, science	70.3	22.5	7.3	56.4	33.2	10.5
Other	0.0	69.0	31.0	0.0	82.3	17.7
Total	58.1	31.9	10.0	52.7	38.1	9.2

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 35. Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1974-75 Graduates in 1976

<u>Major</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>	<u>Bachelor's</u> <u>(Percent)</u>	<u>Master's</u> <u>(Percent)</u>	<u>Doctorate</u> <u>(Percent)</u>
Engineering						
Chemical	74.3	22.6	3.2	62.6	37.4	0.0
Civil	66.6	33.1	0.0	59.9	40.1	0.0
Electrical or electronic	70.3	28.7	1.0	69.5	30.5	0.0
Mechanical	79.5	19.2	1.3	78.7	21.3	0.0
Other ^a	62.5	36.7	0.7	58.6	39.3	2.0
Total, engineering	68.9	30.1	1.0	66.1	33.2	0.6
Science						
Physical	74.4	24.6	1.0	62.6	37.4	0.0
Environmental	70.0	30.0	0.0	52.1	47.9	0.0
Other ^a	83.0	15.9	1.1	70.5	29.5	0.0
Total, science	82.1	16.8	1.0	66.0	34.0	0.0
Other	0.0	90.3	9.7	0.0	100.0	0.0
Total	78.2	20.6	1.2	66.0	33.6	0.4

Source: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147.

^aThe report from which this table is reproduced did not include separate information on life, social, math, and computer scientists, or on nuclear, petroleum, and mining engineers.

Table 36. Educational Attainment by Major Field of Study for Highest Degree Held: Total Versus Energy-Related 1976 Graduates in 1978

<u>Major</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>Bachelor's</u> (Percent)	<u>Master's</u> (Percent)	<u>Doctorate</u> (Percent)	<u>Bachelor's</u> (Percent)	<u>Master's</u> (Percent)	<u>Doctorate</u> (Percent)
Engineering						
Chemical	64.7	33.2	2.1	59.8	37.8	2.4
Civil	70.6	29.2	0.2	66.2	33.1	0.7
Electrical or electronic	63.3	32.6	0.5	69.5	30.5	0.0
Mechanical	70.1	29.5	0.4	75.8	24.2	0.0
Nuclear, petroleum, or mining	47.0	47.0	6.1	41.5	55.0	3.5
Other	64.1	35.5	0.3	71.0	28.7	0.2
Total, engineering	65.3	34.0	0.7	66.2	32.9	0.9
Science						
Physical	71.9	26.4	1.7	57.1	36.0	6.9
Math and computer	69.3	29.6	1.1	77.9	20.7	1.3
Environmental	72.2	27.2	0.6	56.9	42.0	1.1
Life	84.3	15.0	0.8	83.4	16.6	0.0
Psychology and social	82.7	16.4	0.9	80.5	19.5	0.0
Total, science	80.8	18.3	0.9	73.3	25.4	1.3
Other	0.0	85.7	14.3	0.0	96.2	3.8
Total	75.0	23.7	1.4	68.6	30.3	1.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 37. Educational Attainment and Occupation: Total
Versus Energy-Related 1972 Graduates in 1978

Occupation	Total			Energy-Related		
	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)
Engineering						
Chemical	54.5	33.9	11.6	48.3	45.3	6.4
Civil	65.2	32.4	2.3	42.6	52.0	5.4
Electrical or electronic	54.3	43.4	2.3	63.9	32.3	3.8
Mechanical	58.5	37.8	3.6	47.0	48.0	5.0
Nuclear, petroleum, or mining	56.5	35.5	8.0	58.3	33.7	8.1
Other	59.8	36.5	3.7	64.9	30.3	4.8
Total, engineering	58.5	37.6	3.9	56.5	37.8	5.7
Science						
Physical	35.5	37.0	27.5	22.7	34.8	42.5
Math and computer	53.4	41.4	5.2	59.8	36.4	3.9
Environmental	34.0	41.8	24.2	37.4	50.7	11.8
Life	50.3	31.0	18.7	19.2	67.0	13.8
Psychology and social	24.3	51.1	24.7	62.8	32.8	4.4
Total, science	40.4	41.4	18.2	40.4	43.0	16.6
Other	65.3	26.1	8.6	53.7	35.0	11.2
Total	58.1	31.8	10.1	52.2	38.6	9.2

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

Table 38. Educational Attainment and Occupation: Total
Versus Energy-Related 1974-75 Graduates in 1976

Occupation	Total			Energy-Related		
	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)
Engineering						
Chemical	71.5	26.5	2.0	59.1	40.9	0.0
Civil	64.2	35.8	0.0	60.5	39.5	0.0
Electrical or electronic	66.3	32.4	1.3	63.3	36.7	0.0
Mechanical	80.2	19.0	0.7	81.8	18.2	0.0
Other ^a	67.4	32.1	0.5	61.5	36.9	1.6
Total, engineering	68.8	30.5	0.7	65.6	33.8	0.6
Science						
Physical	73.8	24.9	1.4	62.7	37.3	0.0
Environmental	61.5	38.5	0.0	45.5	54.5	0.0
Other ^a	67.8	29.4	2.7	66.8	33.2	0.0
Total, science	68.2	29.3	2.5	59.8	40.2	0.0
Other	88.6	11.0	0.4	80.1	19.9	0.0
Total	78.1	20.8	1.2	66.2	33.4	0.4

Source: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147.

^aThe report from which this table is reproduced did not include separate information on life, social, math, and computer scientists, or on nuclear, petroleum, and mining engineers.

Table 39. Educational Attainment and Occupation: Total
Versus Energy-Related 1976 Graduates in 1978

Occupation	Total			Energy-Related		
	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)	Bachelor's (Percent)	Master's (Percent)	Doctorate (Percent)
Engineering						
Chemical	67.8	30.4	1.8	59.9	38.0	2.1
Civil	69.1	30.9	0.0	62.8	37.2	0.0
Electrical or electronic	63.8	35.6	0.6	63.5	36.5	0.0
Mechanical	70.7	29.0	0.4	79.2	20.5	0.3
Nuclear, petroleum, or mining	69.7	27.0	3.3	66.3	31.2	2.5
Other	66.8	32.7	0.5	66.1	33.7	0.2
Total, engineering	67.4	31.9	0.8	68.2	30.9	0.9
Science						
Physical	68.0	29.8	2.2	63.5	30.4	6.0
Math and computer	62.4	36.8	0.8	70.4	27.9	1.7
Environmental	60.4	38.3	1.2	51.8	47.0	1.3
Life	73.4	25.0	1.7	55.8	44.2	0.0
Psychology and social	50.9	44.2	4.9	49.3	50.7	0.0
Total, science	63.0	34.6	2.4	58.5	39.2	2.2
Other	85.2	13.8	1.0	87.6	12.4	0.0
Total	74.9	23.7	1.4	68.6	30.3	1.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table 40. Comparison of 1976 and 1978 Survey: Percent
Non-White, Total Versus Energy-Related Recent Graduates

Major	Total			Energy-Related		
	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)
Science and engineering	5.1	6.5	6.6	6.5	2.4	4.9
Engineering	5.5	6.8	7.6	7.6	3.1	4.4
Science	5.0	6.4	6.3	5.0	1.0	5.4
<u>Occupation</u>						
Science and engineering	5.5	6.0	7.2	6.9	2.2	4.4
Engineering	5.3	6.5	7.2	8.1	2.3	4.1
Science	5.6	5.6	7.1	3.9	1.7	4.9

Source: 1974-75 Graduates column from Rail, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: 1974-75 graduates surveyed in 1976; 1972 and 1976 graduates surveyed in 1978.

Table 41. Comparison of 1976 and 1978 Survey: Percent
Female, Total Versus Energy-Related Graduates

<u>Major</u>	<u>Total</u>			<u>Energy-Related</u>		
	<u>1972</u> <u>Graduates</u> <u>(Percent)</u>	<u>1974-75</u> <u>Graduates</u> <u>(Percent)</u>	<u>1976</u> <u>Graduates</u> <u>(Percent)</u>	<u>1972</u> <u>Graduates</u> <u>(Percent)</u>	<u>1974-75</u> <u>Graduates</u> <u>(Percent)</u>	<u>1976</u> <u>Graduates</u> <u>(Percent)</u>
Science and engineering	21.6	29.1	29.2	6.0	8.3	13.5
Engineering	1.0	2.5	3.7	0.8	3.1	4.3
Science	27.6	35.0	35.6	13.3	19.5	23.7
<u>Occupation</u>						
Science and engineering	14.5	19.3	22.2	5.8	6.7	9.6
Engineering	2.7	3.4	6.2	2.1	3.7	5.5
Science	23.4	29.1	32.4	15.1	18.3	18.3

Source: 1974-75 Graduates column from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: 1974-75 graduates surveyed in 1976; 1972 and 1976 graduates surveyed in 1978.

Table 42. Type of Employer by Occupation: Total
Versus Energy-Related 1972 Graduates in 1978

<u>Type of Employer</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)
Private industry	55.2	82.5	76.6	87.2	36.6	70.6
Educational institution	18.2	5.3	2.7	1.4	31.6	15.0
Federal government	9.6	5.9	9.6	4.9	9.6	8.5
State and local government	8.7	2.1	6.3	1.6	10.8	3.4
Non-profit organization	2.8	2.7	1.7	3.0	3.7	2.0
Other	5.5	0.8	3.1	1.1	7.6	0.0
No answer	<u>0.0</u>	<u>0.7</u>	<u>0.0</u>	<u>0.7</u>	<u>0.0</u>	<u>0.5</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 43. Type of Employer by Occupation: Total
Versus Energy-Related 1974-75 Graduates in 1976

<u>Type of Employer</u>	<u>Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)
Private industry	46.1	78.1	73.2	81.4	29.2	65.6
Educational institution	20.4	10.3	7.0	7.4	28.8	21.4
Federal government	10.6	5.7	12.3	5.6	9.5	6.5
State and local government	11.1	2.1	5.3	2.1	14.8	1.9
Non-profit organization	10.0	2.2	1.3	1.5	15.4	4.7
Other	<u>1.8</u>	<u>1.6</u>	<u>0.9</u>	<u>2.0</u>	<u>2.3</u>	<u>0.0</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 44. Type of Employer by Occupation: Total
Versus Energy-Related 1976 Graduates in 1978

<u>Type of Employer</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>	<u>Total</u> (Percent)	<u>Energy- Related</u>
Private industry	54.1	75.4	78.5	82.9	35.2	59.3
Educational institution	17.6	12.6	5.5	7.8	27.1	22.9
Federal government	7.6	5.7	7.8	5.0	7.5	7.0
State and local government	8.7	1.7	4.4	0.3	12.1	4.8
Non-profit organization	4.2	1.9	0.7	1.1	6.8	3.6
Other	7.7	0.6	3.0	0.5	11.4	1.1
No answer	<u>0.0</u>	<u>2.1</u>	<u>0.0</u>	<u>2.5</u>	<u>0.0</u>	<u>2.3</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 45. Primary Work Activity by Occupation: Total
Versus Energy-Related 1972 Graduates in 1978

<u>Activity</u>	<u>Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
	<u>(Percent)</u>		<u>(Percent)</u>		<u>(Percent)</u>	
Management	16.9	17.7	21.9	21.3	13.2	8.5
Teaching	8.1	2.2	1.6	1.7	13.1	3.3
Basic research	7.6	5.1	1.0	1.5	12.6	14.5
Applied research	6.6	9.0	4.0	6.8	8.6	14.7
Development	8.8	8.1	14.2	9.4	4.6	5.0
Report, technical writing	5.7	6.0	6.0	5.6	5.5	7.1
Design	7.1	12.6	15.3	17.1	1.0	1.1
Quality control	4.8	5.3	6.2	5.1	3.8	6.1
Operations	8.9	11.5	16.0	15.1	3.6	2.4
Distribution	2.0	1.7	1.7	2.4	2.2	0.0
Consulting	3.9	6.1	4.4	5.7	3.5	7.1
Other	<u>18.6</u>	<u>14.6</u>	<u>7.1</u>	<u>8.4</u>	<u>27.2</u>	<u>30.2</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table 46. Primary Work Activity by Occupation: Total
Versus Energy-Related 1974-75 Graduates in 1976

<u>Activity</u>	<u>Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
	<u>(Percent)</u>		<u>(Percent)</u>		<u>(Percent)</u>	
Management	12.5	8.8	13.9	9.2	11.5	7.4
Teaching	6.8	1.1	2.1	0.4	9.8	4.1
Basic research	11.1	6.6	3.8	4.9	15.7	13.6
Applied research	9.1	14.1	8.1	11.6	9.7	23.4
Development	10.8	10.9	14.5	10.3	8.5	13.2
Report, technical writing	2.0	1.6	1.3	0.8	2.4	4.6
Design	9.8	19.8	22.7	24.6	1.8	0.8
Quality control	6.1	6.8	7.4	6.2	5.4	9.0
Operations ^a	6.3	12.1	9.7	13.9	4.1	5.2
Sales, marketing, etc.	2.0	1.9	2.8	2.0	1.6	1.5
Consulting	3.9	5.8	4.2	6.2	3.6	4.6
Other	<u>19.5</u>	<u>10.6</u>	<u>9.5</u>	<u>10.0</u>	<u>25.8</u>	<u>12.7</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

^aProduction in Rall report.

Table 47. Primary Work Activity by Occupation: Total
Versus Energy-Related 1976 Graduates in 1978

<u>Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>	<u>Total</u>	<u>Energy- Related</u>
	<u>(Percent)</u>		<u>(Percent)</u>		<u>(Percent)</u>	
Management	11.0	11.8	12.3	14.5	10.3	6.2
Teaching	6.6	1.5	1.0	0.7	10.3	3.3
Basic research	9.4	7.3	1.9	2.5	14.2	17.3
Applied research	7.5	10.6	4.7	5.4	9.3	21.8
Development	7.9	8.0	13.7	9.1	4.3	5.7
Report, technical writing	8.1	6.4	8.3	7.0	8.0	5.1
Design	8.0	13.8	18.0	19.3	1.6	2.1
Quality control	7.2	6.8	9.8	7.6	5.5	5.1
Operations	9.9	14.3	17.1	20.4	5.2	1.5
Distribution	2.1	2.1	1.1	2.2	2.7	1.9
Consulting	2.6	3.6	3.7	4.8	1.9	1.1
Other	18.6	13.5	7.7	6.5	25.6	28.6
Total	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>	<u>100.0</u>

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

COMPARISON OF RECENT GRADUATES WITH THE EXPERIENCED WORK FORCE

The 1976 *National Survey of Natural and Social Scientists and Engineers*, conducted for NSF by the Bureau of Census, sampled individuals who were identified as scientists or engineers in the 1970 Census of Population. Since they were in the work force in 1970, these individuals generally were older and had more experience than those in the Westat surveys (discussed earlier), who received their degrees in 1972 or later. The Census survey contained some questions comparable to questions asked in each of the Westat surveys. However, the wording of questions used in the Census survey differed somewhat from questions in the Westat surveys and only rough comparisons can be made. In addition, one must use care in comparing results from the 1978 Westat survey (of 1972 and 1976 graduates) with results from the survey of experienced workers conducted two years earlier, since answers given to a survey in 1978 might have been different than those recorded in 1976. The methods used to classify respondents as scientists or engineers also differed between the Census and Westat surveys.

The Westat samples were drawn from persons who received degrees in a science or engineering field. The Census sample included only persons who met a set of multiple criteria, including field of degree, occupation, and self-identification. As a result, many individuals may have been excluded from the Census survey who would have been included under the Westat criteria.⁵

MAJOR FIELD AND OCCUPATION

As shown in Table 48, recent⁶ engineering graduates seem more likely than experienced engineering majors to be involved in energy-related activities. Differences are largest among civil and mechanical engineers, and appear to have increased between the 1976 and 1978 surveys. However, the difference may be overstated, since the data on experienced workers are for 1976 only. The proportion of energy-related experienced engineers may also have increased in those two years.

In the 1976 surveys, the percentage of new scientists whose work involved energy (3.4 percent) was smaller than the proportion of experienced energy-related scientists (8.9 percent in 1976). In 1978, the energy-related comprised up to 7.3 percent of recent graduates working as scientists, much closer to the proportion of energy-related experienced scientists reported

two years earlier. Both new physical scientists and new environmental scientists were more involved in energy-related activities at the time of the 1978 survey than recent graduates had been two years earlier. However, the percentage of experienced environmental scientists working on energy concerns (48.9 in 1976) remained higher than the percentage of recent graduates in this category (33-34 percent).

Although the energy-related proportion of all new scientists and engineers increased from 4.6 percent of 1974-75 graduates to 8.3 percent of 1976 graduates, it remained below the 12.0 percent of experienced scientists and engineers who were energy-related. This can be at least partly explained by the large proportion of engineers (approximately 65 percent) in the experienced work force, and the small proportion of engineers among recent graduates (20 percent or less). As discussed earlier, engineers are more likely than scientists to work on energy problems.

Due to the differences in classification systems between the survey of experienced scientists and engineers and the surveys of recent graduates, comparisons must be made cautiously. Table 49 indicates that experienced science majors were more likely than recent graduates to be working as scientists. For engineering majors, the table suggests that experienced workers are less likely than recent graduates to be employed as engineers. However, the proportion of experienced workers whose work involves engineering is probably understated. In this table, a person who indicated "administration or management" as his or her occupation was not considered to be employed in either science or engineering, even if that person managed a science or engineering project. Since experienced workers are more likely than recent graduates to have indicated "administration or management" as an occupation, the proportion of experienced workers employed in science or engineering is more likely to be understated.

SEX AND RACE

According to the 1976 survey, non-whites comprised a smaller proportion of those working as scientists and engineers who graduated in 1974-75 (2.2 percent) than of experienced scientists and engineers (3.3 percent) (Table 50). In 1978, the proportion of non-white scientists and engineers had increased to 6.9 percent of 1972 graduates and 4.4 percent of 1976 graduates, indicating that non-white participation in energy-related activities increased between 1976 and 1978.

The proportion of females among all recent graduates was higher than the 1.0 percent among experienced workers (Table 51). This was especially true of 1976 graduates by occupation (9.6 percent female).

TYPE OF EMPLOYER

Table 52 compares energy-related recent graduates with energy-related experienced workers by type of employer. Recent graduates are more likely than experienced workers to be employed in educational institutions, but otherwise the two groups are similar. Six years after graduation, the pattern of 1972 engineers resembles that of the experienced engineers.

PRIMARY WORK ACTIVITY

Management and consulting activities are, predictably, more common to experienced workers than to recent graduates (Tables 53 through 55). However, engineers who graduated in 1972 are more likely than later graduates (though still less likely than experienced workers) to be involved in management. New engineers are more likely than experienced ones to work on applied research, quality control and operations. A higher percentage of new than experienced scientists are active in basic research, and a larger proportion of 1974 and later graduates seem to be working in applied research than of their more experienced counterparts.

Table 48. Percent Energy-Related: Recent Graduates Versus Experienced Workers

Field	Major				Occupation			
	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)	Experienced Workers (Percent)	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)	Experienced Workers (Percent)
Engineering								
Chemical	31.9	23.2	42.5	21.5	32.0	29.0	35.9	23.7
Civil	15.3	16.6	18.4	8.1	10.0	17.1	17.5	7.5
Electrical or electronic	14.5	14.3	14.1	11.3	13.8	18.5	14.4	12.0
Mechanical	31.5	24.5	34.7	16.5	40.0	31.4	37.5	18.8
Other	16.4	15.5	19.8	14.4	25.5	18.8	24.8	14.6
Total, engineering	19.3	17.5	22.1	13.6	23.3	21.0	24.5	14.3
Science								
Physical	10.8	4.3	11.5	8.4	15.4	6.5	18.0	7.4
Environmental	18.5	16.8	24.6	44.6	33.2	26.6	34.0	48.9
Other	2.7	1.3	3.8	3.3	3.7	2.0	4.1	3.4
Total, science	4.0	1.8	5.0	8.6	6.8	3.4	7.3	8.9
Other	4.2	0.4	3.4	8.9	2.0	1.4	2.6	9.4
Total	7.0	4.6	8.3	12.0	7.0	4.6	8.3	12.0

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: The reader should remember that the 1974-75 graduates and experienced workers were surveyed in 1976, while the 1972 and 1976 graduates were surveyed in 1978.

P6

Table 49. Comparison of Major Field of Study for Highest Degree
Held and Occupation: Energy-Related Recent Graduates
Versus Energy-Related Experienced Workers

Major	Percent with Occupation Similar to College Major			
	1972 Graduates in 1978 (Percent)	1974-75 Graduates in 1976 (Percent)	1976 Graduates in 1978 (Percent)	Experienced Workers in 1976 (Percent)
Science and engineering	75.4	79.9	73.4	74.3
Engineering	89.6	91.1	91.6	76.7
Science	55.2	55.5	53.1	64.7

Source: 1974-75 and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: In this table, the science and engineering fields are not subdivided into specialty areas. All graduates are included if their occupation is in the same major (either science or engineering) in which they hold their highest degree.

Table 50. Percent Non-White: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers

<u>Major</u>	<u>Recent Graduates</u>			<u>Experienced Workers in 1976</u>
	<u>1972 Graduates</u> (Percent)	<u>1974-75 Graduates</u> (Percent)	<u>1976 Graduates</u> (Percent)	
Science and engineering	6.5	2.4	4.9	2.9
Engineering	7.6	3.1	4.4	3.1
Science	5.0	1.0	5.4	2.3
<u>Occupation</u>				
Science and engineering	6.9	2.2	4.4	3.3
Engineering	8.1	2.3	4.1	3.3
Science	3.9	1.7	4.9	3.3

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978 and the 1974-75 graduates and experienced workers were surveyed in 1976.

Table 51. Percent Female: Energy-Related Recent Graduates
Versus Energy-Related Experienced Workers

Major	Recent Graduates			Experienced Workers (Percent)
	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)	
Science and engineering	6.0	8.3	13.5	0.9
Engineering	0.8	3.1	4.3	0.2
Science	13.3	19.5	23.7	3.5
<u>Occupation</u>				
Science and engineering	5.8	6.7	9.6	1.0
Engineering	2.1	3.7	5.5	0.2
Science	15.1	18.3	18.3	4.3

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978, and the 1974-75 graduates and experienced workers were surveyed in 1976.

Table 52. Type of Employer Versus Occupation: Energy-Related
Recent Graduates Versus Energy-Related Experienced Workers

Type of Employer	Recent Graduates			Experienced Workers (Percent)
	1972 Graduates (Percent)	1974-75 Graduates (Percent)	1976 Graduates (Percent)	
	All Scientists and Engineers			
Private industry	82.5	78.1	75.4	80.2
Educational institution	5.3	10.3	12.6	2.4
Federal government	5.9	5.7	5.7	6.3
State and local government	2.1	2.1	1.7	2.6
Non-profit organization	2.7	2.2	1.9	1.8
Other	0.8	1.6	0.6	6.7
Total	100.0	100.0	100.0	100.0
Engineers				
Private industry	87.2	81.4	82.9	82.2
Educational institution	1.4	7.4	7.8	2.4
Federal government	4.9	5.6	5.0	5.8
State and local government	1.6	2.1	0.3	2.5
Non-profit organization	3.0	1.5	1.1	1.6
Other	1.1	2.0	0.5	5.4
Total	100.0	100.0	100.0	100.0
Scientists				
Private industry	70.6	65.6	59.3	71.5
Educational institution	15.0	21.4	22.9	2.6
Federal government	8.5	6.5	7.0	8.2
State and local government	3.4	1.9	4.8	3.1
Non-profit organization	2.0	4.7	3.6	2.4
Other	0.0	0.0	1.1	12.3
Total	100.0	100.0	100.0	100.0

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTES: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978, and the 1974-75 graduates and experienced workers were surveyed in 1976.

Figures may not add to 100.0 percent due to independent rounding.

Table 53. Primary Work Activity of Scientists and Engineers: Energy-Related Recent Graduates Versus Energy-Related Experienced Workers

<u>Primary Work Activity</u>	<u>Recent Graduates</u>			<u>Experienced Workers (Percent)</u>
	<u>1972 Graduates (Percent)</u>	<u>1974-75 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>	
Management	17.7	8.8	11.8	26.3
Teaching	2.2	1.1	1.5	0.7
Basic research	5.1	6.6	7.3	1.1
Applied research	9.0	14.1	10.6	5.4
Development	8.1	10.9	8.0	10.8
Report, technical writing	6.0	1.6	6.4	3.0
Design	12.6	19.8	13.8	15.6
Quality control	5.3	6.8	6.8	3.7
Operations	11.5	12.1	14.3	11.4
Distribution	1.7	1.9	2.1	2.9
Consulting	6.1	5.8	3.6	8.8
Other	<u>14.6</u>	<u>10.6</u>	<u>13.5</u>	<u>10.4</u>
Total	100.0	100.0	100.0	100.0

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTES: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978, and the 1974-75 graduates and experienced workers were surveyed in 1976.

Figures may not add to 100.0 percent due to independent rounding.

Table 54. Primary Work Activity of Engineers: Energy-Related
Recent Graduates Versus Energy-Related Experienced Workers

<u>Primary Work Activity</u>	<u>Recent Graduates</u>			<u>Experienced Workers</u> <u>(Percent)</u>
	<u>1972 Graduates</u> <u>(Percent)</u>	<u>1974-75 Graduates</u> <u>(Percent)</u>	<u>1976 Graduates</u> <u>(Percent)</u>	
Management	21.3	9.2	14.5	27.6
Teaching	1.7	0.4	0.7	0.6
Basic research	1.5	4.9	2.5	0.4
Applied research	6.8	11.6	5.4	3.1
Development	9.4	10.3	9.1	10.7
Report, technical writing	5.6	0.8	7.0	2.6
Design	17.1	24.6	19.3	18.8
Quality control	5.1	6.2	7.6	3.5
Operations	15.1	13.9	20.4	12.8
Distribution	2.4	2.0	2.2	3.4
Consulting	5.7	6.2	4.8	8.3
Other	<u>8.4</u>	<u>10.0</u>	<u>6.5</u>	<u>8.2</u>
Total	100.0	100.0	100.0	100.0

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTES: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978, and the 1974-75 graduates and experienced workers were surveyed in 1976.

Figures may not add to 100.0 percent due to independent rounding.

Table 55. Primary Work Activity of Scientists: Energy-Related
Recent Graduates Versus Energy-Related Experienced Workers

<u>Primary Work Activity</u>	<u>Recent Graduates</u>			<u>Experienced Workers (Percent)</u>
	<u>1972 Graduates (Percent)</u>	<u>1974-75 Graduates (Percent)</u>	<u>1976 Graduates (Percent)</u>	
Management	8.5	7.4	6.2	20.6
Teaching	3.3	4.1	3.3	1.1
Basic research	14.5	13.6	17.3	4.5
Applied research	14.7	23.4	21.8	15.2
Development	5.0	13.2	5.7	11.1
Report, technical writing	7.1	4.6	5.1	4.7
Design	1.1	0.8	2.1	1.6
Quality control	6.0	9.0	5.1	4.7
Operations	2.4	5.2	1.5	5.1
Distribution	0.0	1.5	1.9	0.4
Consulting	7.1	4.6	1.1	10.9
Other	<u>30.2</u>	<u>12.7</u>	<u>25.6</u>	<u>19.9</u>
Total	100.0	100.0	100.0	100.0

Source: 1974-75 Graduates and Experienced Workers columns from Rall, Jane E., *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147. 1972 and 1976 Graduates columns from Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTES: The reader should remember that the 1972 and 1976 graduates were surveyed in 1978, and the 1974-75 graduates and experienced workers were surveyed in 1976.

Figures may not add to 100.0 percent due to independent rounding.

NOTES

¹Jane E. Rall, *Energy-Related Scientists and Engineers: Statistical Profile of New Entrants into the Work Force, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, October 1978), ORAU-147.

²Michael G. Finn and Jane E. Rall, *Energy-Related Scientists and Engineers: Statistical Profile from the NSF National Sample, 1976* (Oak Ridge, Tennessee: Oak Ridge Associated Universities, May 1978), ORAU-143.

³Differences are discussed in Rall (1976).

⁴See Rall (1976).

⁵For further explanation, see Finn and Rall (1976).

⁶For convenience, "recent graduates" is used here to refer to the 1972, 1974, 1975, and 1976 graduates included in the Westat surveys. "Experienced" workers denotes those included in the Census survey.

APPENDIX A - ADDITIONAL TABLES

A-1	Detailed Major Field of Study for Highest Degree Held Versus Major Energy Source: Energy-Related 1972 Graduates in 1978	A-4
A-2	Detailed Major Field of Study for Highest Degree Held Versus Major Energy Source: 1976 Graduates in 1978.	A-5
A-3	Detailed Occupation Versus Major Energy Source Involved in Energy- Related Activities: Energy-Related 1972 Graduates in 1978.	A-6
A-4	Detailed Occupation Versus Major Energy Source Involved in Energy- Related Activities: Energy-Related 1976 Graduates in 1978.	A-7
A-5	Major Energy Source Involved in Energy-Related Activities Versus Highest Degree Held: Energy-Related 1972 Graduates in 1978.	A-8
A-6	Major Energy Source Involved in Energy-Related Activities Versus Highest Degree Held: Energy-Related 1976 Graduates in 1978.	A-9
A-7	Type of Employer Versus Major Energy Source Involved in Energy- Related Activities: Energy-Related 1972 Graduates in 1978.	A-10
A-8	Type of Employer Versus Major Energy Source Involved in Energy- Related Activities: Energy-Related 1976 Graduates in 1978.	A-11
A-9	Annual Salary Versus Major Energy Source: Energy-Related 1972 Graduates in 1978.	A-12
A-10	Annual Salary Versus Major Energy Source: Energy-Related 1976 Graduates in 1978.	A-13
A-11	Major Field of Study for Highest Degree Held Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978.	A-14
A-12	Major Field of Study for Highest Degree Held Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978	A-16
A-13	Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978.	A-18
A-14	Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978.	A-20
A-15	Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978.	A-22
A-16	Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978.	A-23

A-17	Annual Salary Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978	A-24
A-18	Annual Salary Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978	A-25
A-19	Major Field of Study for Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978.	A-26
A-20	Major Field of Study for Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978.	A-27
A-21	Occupation Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978.	A-28
A-22	Occupation Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978.	A-29
A-23	Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978	A-30
A-24	Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978	A-30
A-25	Principal Employer Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978	A-31
A-26	Principal Employer Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978	A-31
A-27	Detailed Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related 1972 Graduates in 1978	A-32
A-28	Detailed Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related 1976 Graduates in 1978. . . .	A-34
A-29	Type of Employer by Occupation: Total Versus Energy-Related Recent Graduates and Bachelors Versus Masters; 1972 Graduates in 1978.	A-36
A-30	Type of Employer by Occupation: Total Versus Energy-Related Recent Graduates and Bachelors Versus Masters, 1976 Graduates in 1978.	A-37
A-31	Primary Work Activity Involved in the Occupation of Energy-Related 1972 Graduates: Bachelors Versus Masters in 1978.	A-38
A-32	Primary Work Activity Involved in the Occupation of Energy-Related 1976 Graduates: Bachelors Versus Masters in 1978.	A-39
A-33	Primary Work Activity Involved in the Occupation of 1972 Graduates: Total Bachelors Versus Masters in 1978	A-40

A-34	Primary Work Activity by Occupation of 1976 Graduates: Total Bachelors Versus Masters in 1978	A-41
A-35	Major Field of Study for Highest Degree Held Versus Employment Status: Total 1972 Graduates in 1978.	A-42
A-36	Major Field of Study for Highest Degree Held Versus Employment Status: Total 1976 Graduates in 1978.	A-43
A-37	Major Field of Study for Highest Degree Held Versus Employment Status: Energy-Related 1972 Graduates in 1978	A-44
A-38	Major Field of Study for Highest Degree Held Versus Employment Status: Energy-Related 1976 Graduates in 1978	A-45
A-39	Median Annual Salary: Total Versus Energy-Related 1972 Graduates in 1978, Bachelors	A-46
A-40	Median Annual Salary: Total Versus Energy-Related 1976 Graduates in 1978, Bachelors	A-47
A-41	Median Annual Salary: Total Versus Energy-Related 1972 Graduates in 1978, Masters	A-48
A-42	Median Annual Salary: Total Versus Energy-Related 1976 Graduates in 1978, Masters	A-49

Table A-1. Detailed Major Field of Study for Highest Degree Held Versus Major Energy Source: Energy-Related 1972 Graduates in 1978^a

Major	Energy Source											
	Coal and Coal Products	Percent	Petroleum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
Engineering												
Chemical	446	11.4	416	5.8	287	10.1	165	3.9	60	3.0	41	1.9
Civil	390	10.0	395	5.6	102	3.6	279	6.6	34	1.7	116	5.4
Electrical or electronic	514	13.2	358	5.0	140	4.9	331	7.9	280	13.9	511	23.8
Mechanical	896	23.0	590	8.3	392	13.9	739	17.6	259	12.8	320	14.9
Nuclear, petroleum, or mining	157	4.0	403	5.7	191	6.8	805	19.2	11	0.6	22	1.0
Other	418	10.7	739	10.4	295	10.4	346	8.2	93	4.6	123	5.7
Total, engineering	2,821	72.3	2,901	40.7	1,407	49.8	2,665	63.5	737	36.4	1,133	52.8
Science												
Physical	243	6.2	375	5.3	125	4.4	468	11.1	342	16.9	162	7.5
Math and computer	393	10.1	533	7.5	60	2.1	217	5.2	0	0.0	171	7.9
Environmental	175	4.5	689	9.7	360	12.8	185	4.4	66	3.3	145	6.7
Life	126	3.2	670	9.4	274	9.7	128	3.0	513	25.3	46	2.2
Psychology and social	0	0.0	725	10.2	415	14.7	440	10.5	365	18.0	53	2.5
Total, science	937	24.0	2,992	42.1	1,234	43.7	1,438	34.2	1,286	63.5	577	26.9
Other	145	3.7	1,226	17.2	184	6.5	98	2.3	0	0.0	436	20.3
Total	3,903	100.0	7,122	100.0	2,626	100.0	4,199	100.0	2,024	100.0	2,147	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-2. Detailed Major Field of Study for Highest Degree Held Versus Major Energy Source, 1976 Graduates in 1978^a

Major	Energy Source											
	Coal and Coal Products	Percent	Petroleum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
Engineering												
Chemical	305	7.2	914	11.7	292	7.7	62	1.2	100	6.1	144	6.9
Civil	409	9.7	559	7.1	211	5.6	419	8.0	105	6.4	137	6.6
Electrical or electronic	346	8.2	709	9.0	206	5.4	321	6.1	36	2.2	235	11.3
Mechanical	647	15.3	764	9.7	625	16.5	696	13.3	327	19.9	111	5.4
Nuclear, petroleum, or mining	234	5.5	492	6.3	47	1.2	690	13.2	0	0.0	79	3.8
Other	313	7.4	635	8.1	727	19.2	614	11.7	206	12.5	280	13.5
Total, engineering	2,254	53.4	4,073	51.9	2,108	55.5	2,802	53.4	774	47.2	986	47.5
Science												
Physical	249	5.9	223	2.8	116	3.1	566	10.8	211	12.9	166	8.0
Math and computer	253	6.0	913	11.6	236	6.2	86	1.6	174	10.6	129	6.2
Environmental	307	7.3	804	10.3	432	11.4	490	9.3	97	5.9	42	2.0
Life	339	8.0	883	11.3	83	2.2	513	9.8	160	9.7	436	21.0
Psychology and social	793	18.8	689	8.8	778	20.5	764	14.5	211	12.9	316	15.2
Total, science	1,941	46.0	3,512	44.8	1,645	43.3	2,419	46.1	853	52.0	1,089	52.4
Other	29	0.7	259	3.3	41	1.1	30	0.6	14	0.9	0	0.0
Total	4,224	100.0	7,842	100.0	3,795	100.0	5,251	100.0	1,641	100.0	2,077	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-3. Detailed Occupation Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1972 Graduates in 1978^a

Occupation	Energy Source											
	Coal and Coal Products	Percent	Petroleum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
Engineering												
Chemical	192	4.9	334	4.7	173	6.1	165	3.9	33	1.8	41	1.9
Civil	185	4.7	184	2.6	24	0.8	202	4.8	13	0.8	82	3.8
Electrical or electronic	538	13.8	206	2.9	158	5.6	174	4.2	108	6.1	440	20.5
Mechanical	596	15.3	1,236	17.4	374	13.2	637	15.2	270	15.2	16	0.7
Nuclear, petroleum, or mining	331	8.5	868	12.2	499	17.6	1,588	37.8	11	0.6	83	3.9
Other	808	20.7	958	13.5	316	11.2	383	9.1	318	17.9	485	22.6
Total, engineering	2,650	67.9	3,786	53.4	1,544	54.6	3,149	75.0	753	42.4	1,147	53.4
Science												
Physical	176	4.5	381	5.4	102	3.6	385	9.2	159	9.0	66	3.1
Math and computer	185	4.7	454	6.4	29	1.0	203	4.8	295	16.6	95	4.4
Environmental	92	2.4	772	10.9	342	12.1	228	5.4	66	3.7	145	6.7
Life	162	4.2	70	1.0	0	0.0	14	0.3	252	14.2	40	1.8
Psychology and social	24	0.6	188	2.6	206	7.3	10	0.2	18	1.0	181	8.4
Total, science	639	16.4	1,865	26.3	679	24.0	840	20.0	790	44.5	527	24.5
Other	614	15.7	1,442	20.3	603	21.3	210	5.0	232	13.1	474	22.1
Total	3,903	100.0	7,094	100.0	2,826	100.0	4,199	100.0	1,775	100.0	2,147	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-4. Detailed Occupation Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1976 Graduates in 1978

Occupation	Energy Source											
	Coal and Coal Products	Percent	Petroleum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
Engineering												
Chemical	226	5.3	689	8.8	252	6.7	76	1.4	114	6.9	191	9.2
Civil	324	7.7	322	4.1	143	3.8	475	9.0	69	4.2	127	6.1
Electrical or electronic	514	12.2	477	6.1	170	4.5	308	5.9	48	2.9	206	9.9
Mechanical	531	12.6	1,125	14.4	847	22.3	755	14.4	401	24.4	123	5.9
Nuclear, petroleum, or mining	279	6.6	1,438	18.3	472	12.4	955	18.2	0	0.0	28	1.4
Other	557	13.2	612	7.8	504	13.3	568	10.8	327	19.9	280	13.5
Total, engineering	2,431	57.6	4,663	59.5	2,388	62.9	3,137	59.7	959	58.4	955	46.0
Science												
Physical	380	9.0	210	2.7	81	2.1	624	11.9	193	11.8	274	13.2
Math and computer	78	1.9	782	10.0	174	4.6	89	1.7	54	3.3	129	6.2
Environmental	273	6.5	710	9.1	312	8.2	461	8.8	77	4.7	34	1.6
Life	63	1.5	32	0.4	0	0.0	91	1.7	157	9.6	205	9.9
Psychology and social	144	3.4	447	5.7	42	1.1	0	0.0	65	4.0	86	4.2
Total, science	938	22.2	2,181	27.8	609	16.0	1,265	24.1	546	33.3	728	35.1
Other	855	20.2	995	12.7	797	21.0	849	16.2	137	8.3	393	18.9
Total	4,224	100.0	7,842	100.0	3,795	100.0	5,251	100.0	1,641	100.0	2,077	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-5. Major Energy Source Involved in Energy-Related Activities
Versus Highest Degree Held: Energy-Related 1972 Graduates in 1978

<u>Energy Source</u>	<u>Highest Degree Held</u>			
	<u>Bachelor's</u>	<u>Percent</u>	<u>Master's or Doctorate</u>	<u>Percent</u>
Coal, coal products	2,315	59.3	1,588	40.7
Petroleum	3,290	46.2	3,831	53.8
Natural gas	2,081	73.6	745	26.3
Nuclear ^a	2,243	53.4	1,956	46.6
Solar	1,012	50.0	1,012	50.0
Other	440	20.5	1,708	79.5
No data	<u>940</u>	<u>81.0</u>	<u>220</u>	<u>19.1</u>
Total	12,322	52.7	11,061	47.3

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aIncludes fission and fusion.

Table A-6. Major Energy Source Involved in Energy-Related Activities
Versus Highest Degree Held: Energy-Related 1976 Graduates in 1978

<u>Energy Source</u>	<u>Highest Degree Held</u>			
	<u>Bachelor's</u>	<u>Percent</u>	<u>Master's or Doctorate</u>	<u>Percent</u>
Coal, coal products	3,030	71.7	1,194	28.2
Petroleum	5,718	72.9	2,123	27.0
Natural gas	2,881	75.9	914	24.1
Nuclear ^a	3,505	66.8	1,746	33.3
Solar	891	54.3	750	45.7
Other	1,398	67.3	679	32.7
No data	<u>490</u>	37.9	<u>804</u>	62.1
Total	17,913	68.6	8,210	31.4

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aIncludes fission and fusion.

Table A-7. Type of Employer Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1972 Graduates in 1978^a

Employer	Energy Source													
	Coal, Coal Products	Percent	Petrol- eum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent	No Data	Percent
Private industry	3,462	89.0	6,636	93.2	2,669	94.4	3,043	73.5	1,213	59.9	1,207	57.7	731	63.0
Education	84	2.2	187	2.6	0	0.0	244	5.9	509	25.1	167	8.0	43	3.7
All government (civilian)	263	6.7	192	2.7	128	4.5	418	10.1	117	5.8	401	19.1	340	29.3
Other	81	2.1	107	1.4	29	1.0	432	10.4	185	9.2	318	15.2	46	4.0
Total	3,890	100.0	7,121	100.0	2,826	100.0	4,138	100.0	2,024	100.0	2,092	100.0	1,161	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-8. Type of Employer Versus Major Energy Source Involved in Energy-Related Activities: Energy-Related 1976 Graduates in 1978^a

Employer	Energy Source													
	Coal, Coal Products	Percent	Petrol- eum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent	No Data	Percent
Private industry	3,169	78.5	6,839	87.7	2,873	83.2	3,339	63.6	683	42.7	1,460	71.7	769	59.4
Education	448	11.1	475	6.1	110	3.2	667	12.7	613	38.3	309	15.2	313	24.2
All government (civilian)	265	6.6	482	6.2	469	13.6	504	9.6	105	6.5	180	8.8	189	14.6
Other	157	3.9	0	0.0	0	0.0	742	14.1	200	12.5	88	4.3	23	1.8
Total	4,039	100.0	7,796	100.0	3,452	100.0	5,251	100.0	1,601	100.0	2,036	100.0	1,295	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-9. Annual Salary Versus Major Energy
Source: Energy-Related 1972 Graduates in 1978^a

Salary (Dollars)	Energy Source											
	Coal, Coal Products	Percent	Petrol- eum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
10,000 or less	44	1.3	142	2.1	0	0.0	225	6.2	179	11.8	82	3.9
10,100 to 15,000	137	3.9	210	3.0	404	15.2	264	7.3	353	23.0	113	5.4
15,100 to 20,000	1,163	33.6	1,555	22.5	581	21.8	802	22.3	533	34.7	434	20.8
20,100 to 25,000	1,389	40.1	2,739	39.6	990	37.2	1,554	43.2	376	24.5	949	45.5
25,100 to 30,000	640	18.5	1,458	21.1	507	19.0	517	14.4	37	2.4	261	12.5
Over 30,000	90	2.6	804	11.6	182	6.8	239	6.6	55	3.6	247	11.8
Total	3,463	100.0	6,908	100.0	2,665	100.0	3,600	100.0	1,534	100.0	2,086	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-10. Annual Salary Versus Major Energy
Source: Energy-Related 1976 Graduates in 1978^a

Salary (Dollars)	Energy Source											
	Coal, Coal Products	Percent	Petrol- eum	Percent	Natural Gas	Percent	Nuclear	Percent	Solar	Percent	Other	Percent
10,000 or less	359	9.0	432	6.0	560	15.1	1,057	21.4	491	31.8	285	16.2
10,100 to 15,000	757	19.1	1,327	18.2	655	17.6	1,010	20.5	350	22.7	477	27.3
15,100 to 20,000	2,031	51.2	3,060	42.0	1,259	33.9	2,102	42.6	475	30.8	585	33.4
20,100 to 25,000	758	19.1	1,788	24.5	671	18.0	502	10.2	191	12.4	251	14.4
25,100 to 30,000	48	1.2	434	6.0	430	11.6	201	4.1	0	0.0	111	6.4
Over 30,000	13	0.3	246	3.4	142	3.8	62	1.3	36	2.3	39	2.2
Total	3,965	100.0	7,287	100.0	3,717	100.0	4,934	100.0	1,542	100.0	1,748	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-11. Major Field of Study for Highest Degree Held Versus Major
Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a

Major	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
Engineering								
Chemical	0	93	528	46	38	136	70	170
Civil	40	55	147	405	157	55	34	120
Electrical or electronic	173	35	349	391	845	153	10	296
Mechanical	0	163	806	594	272	482	0	554
Nuclear, petroleum, or mining	110	393	250	353	24	89	106	102
Other	55	440	454	259	145	214	11	328
Total, engineering	378	1,179	2,534	2,048	1,481	1,129	231	1,570
Science								
Physical	41	45	464	171	31	104	41	397
Math and computer	489	0	179	65	33	32	36	268
Environmental	1,050	153	27	36	27	27	126	106
Life	67	272	316	189	81	105	210	304
Psychology and social	0	0	158	105	188	272	53	959
Total, science	1,663	470	1,144	566	360	540	466	2,034
Other	16	0	254	89	122	46	116	576
Total	2,040	1,649	3,932	2,702	1,963	1,714	813	4,180

A-14

Table A-11. Major Field of Study for Highest Degree Held Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a (Continued)

Major	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Engineering								
Chemical	0.0	5.6	13.4	1.7	1.9	7.9	8.7	4.1
Civil	1.9	3.3	3.7	15.0	8.0	3.2	4.2	2.9
Electrical or electronic	8.5	2.1	8.9	14.5	43.0	8.9	1.3	7.1
Mechanical	0.0	9.9	20.5	22.0	13.9	28.1	0.0	13.3
Nuclear, petroleum, or mining	5.4	23.8	6.3	13.1	1.2	5.2	13.0	2.4
Other	2.7	26.7	11.5	9.6	7.4	12.5	1.4	7.8
Total, engineering	18.5	71.5	64.4	75.8	75.4	65.9	28.4	37.6
Science								
Physical	2.0	2.7	11.8	6.3	1.6	6.1	5.0	9.5
Math and computer	24.0	0.0	4.6	2.4	1.7	1.8	4.4	6.4
Environmental	51.5	9.3	0.7	1.3	1.4	1.6	15.5	2.5
Life	3.3	16.5	8.0	7.0	4.1	6.1	25.8	7.3
Psychology and social	0.0	0.0	4.0	3.9	9.6	15.9	6.5	22.9
Total, science	80.8	28.5	29.1	20.9	18.3	31.5	57.3	48.7
Other	0.8	0.0	6.5	3.3	6.2	2.7	14.2	13.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-12. Major Field of Study for Highest Degree Held Versus Major
Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a

Major	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
Engineering								
Chemical	11	127	552	11	54	350	55	217
Civil	72	189	258	512	221	75	60	184
Electrical or electronic	113	72	172	317	386	194	29	478
Mechanical	130	127	813	676	278	501	93	253
Nuclear, petroleum, or mining	99	464	135	374	0	16	99	176
Other	99	140	388	258	452	459	203	334
Total, engineering	524	1,119	2,318	2,148	1,391	1,595	549	1,642
Science								
Physical	62	129	257	240	98	71	36	482
Math and computer	345	67	163	40	224	62	38	330
Environmental	1,306	178	137	59	12	80	71	147
Life	455	156	167	80	50	80	387	624
Psychology and social	42	0	395	74	366	443	367	1,137
Total, science	2,210	530	1,119	493	750	736	899	2,720
Other	19	0	46	9	29	131	0	98
Total	2,753	1,650	3,483	2,651	2,171	2,462	1,447	4,460

A-16

123

Table A-12. Major Field of Study for Highest Degree Held Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a (Continued)

Major	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Engineering								
Chemical	0.4	7.7	15.9	0.4	2.5	14.2	4.5	4.9
Civil	2.6	11.4	7.4	19.3	10.2	3.1	4.1	4.1
Electrical or electronic	4.1	4.4	4.9	12.0	17.8	7.9	2.0	10.7
Mechanical	4.7	7.7	23.3	25.5	12.8	20.4	6.4	5.7
Nuclear, petroleum, or mining	3.6	28.1	3.9	14.1	0.0	0.7	6.8	3.9
Other	3.6	8.5	11.1	9.7	20.8	18.6	14.0	7.5
Total, engineering	19.0	67.8	66.6	81.0	64.1	64.8	37.9	36.8
Science								
Physical	2.3	7.8	7.4	9.1	4.5	2.9	2.5	10.8
Math and computer	12.5	4.0	4.7	1.5	10.3	2.5	2.6	7.4
Environmental	47.4	10.8	3.9	2.2	0.6	3.3	4.9	3.3
Life	16.5	9.5	4.8	3.0	2.3	3.3	26.7	14.0
Psychology and social	1.5	0.0	11.3	2.8	16.9	18.0	25.3	25.5
Total, science	80.3	32.1	32.1	18.6	34.5	29.9	62.1	61.0
Other	0.7	0.0	1.3	0.4	1.3	5.3	0.0	2.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-13. Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a

	Energy-Related Activity							
Occupation	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
Engineering								
Chemical	0	60	415	19	19	106	38	189
Civil	29	44	124	270	86	13	31	31
Electrical or electronic	122	0	148	276	733	130	0	182
Mechanical	0	104	615	578	167	452	36	553
Nuclear, petroleum, or mining	205	846	510	471	131	137	225	574
Other	61	296	764	316	279	314	46	515
Total, engineering	417	1,350	2,576	1,930	1,415	1,152	376	2,044
Science								
Physical	0	62	258	263	0	27	41	296
Math and computer	375	18	126	152	35	0	0	529
Environmental	1,162	122	0	36	27	27	27	122
Life	0	0	33	27	0	129	198	150
Psychology and social	27	0	0	0	206	0	77	216
Total, science	1,564	202	417	478	268	183	343	1,313
Other	59	96	690	292	253	377	94	823
Total	2,040	1,649	3,683	2,702	1,936	1,714	813	4,180

A-18

Table A-13. Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a (Continued)

	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Engineering								
Chemical	0.0	3.6	11.3	0.7	1.0	6.2	4.6	4.5
Civil	1.4	2.7	3.4	10.0	4.4	0.8	3.8	0.7
Electrical or electronic	6.0	0.0	4.0	10.2	37.9	7.6	0.0	4.4
Mechanical	0.0	6.3	16.7	21.4	8.6	26.4	4.4	13.2
Nuclear, petroleum, or mining	10.1	51.3	13.8	17.4	6.8	8.0	27.7	13.7
Other	3.0	18.0	20.7	11.7	14.4	18.3	5.7	12.3
Total, engineering	20.4	81.9	70.0	71.4	73.1	67.2	46.2	48.9
Science								
Physical	0.0	3.8	7.0	9.7	0.0	1.6	5.0	7.1
Math and computer	18.4	1.1	3.4	5.6	1.8	0.0	0.0	12.7
Environmental	57.0	7.4	0.0	1.3	1.4	1.6	3.4	2.9
Life	0.0	0.0	0.9	1.0	0.0	7.5	24.3	3.6
Psychology and social	1.3	0.0	0.0	0.0	10.6	0.0	9.5	5.2
Total, science	76.7	12.2	11.3	17.7	13.8	10.7	42.2	31.4
Other	2.9	5.8	18.7	10.8	13.1	22.0	11.6	19.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-14. Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a

Occupation	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
Engineering								
Chemical	48	22	488	36	14	350	64	259
Civil	98	102	294	441	176	0	34	127
Electrical or electronic	91	43	122	352	427	135	29	348
Mechanical	0	39	851	715	279	704	80	287
Nuclear, petroleum, or mining	509	993	371	377	118	25	99	388
Other	37	86	599	327	336	316	417	534
Total, engineering	783	1,285	2,725	2,248	1,350	1,530	723	1,943
Science								
Physical	131	48	452	137	98	47	120	462
Math and computer	340	69	90	32	204	38	38	281
Environmental	1,228	169	125	0	0	12	73	97
Life	83	11	0	0	24	91	173	257
Psychology and social	0	20	0	82	42	519	144	375
Total, science	1,782	317	667	251	368	707	548	1,472
Other	188	48	91	152	453	224	176	1,045
Total	2,753	1,650	3,483	2,651	2,171	2,462	1,447	4,460

A-20

Table A-14. Detailed Occupation Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a (Continued)

Occupation	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
Engineering								
Chemical	1.7	1.3	14.0	1.4	0.6	14.2	4.4	5.8
Civil	3.6	6.2	8.4	16.6	8.1	0.0	2.4	2.8
Electrical or electronic	3.3	2.6	3.5	13.3	19.7	5.5	2.0	7.8
Mechanical	0.0	2.4	24.4	27.0	12.8	28.6	5.5	6.4
Nuclear, petroleum, or mining	18.5	60.2	10.6	14.2	5.4	1.0	6.8	8.7
Other	1.3	5.2	17.2	12.3	15.5	12.8	28.8	12.0
Total, engineering	28.4	77.9	78.2	84.8	62.2	62.1	50.0	43.6
Science								
Physical	4.8	2.9	13.0	5.2	4.5	1.9	8.3	10.4
Math and computer	12.3	4.2	2.6	1.2	9.4	1.5	2.6	6.3
Environmental	44.6	10.2	3.6	0.0	0.0	0.5	5.0	2.2
Life	3.0	0.7	0.0	0.0	1.1	3.7	12.0	5.8
Psychology and social	0.0	1.2	0.0	3.1	1.9	21.1	10.0	8.4
Total, science	64.7	19.2	19.2	9.5	17.0	28.7	37.9	33.0
Other	6.8	2.9	2.6	5.7	20.0	9.1	12.2	23.4
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-15. Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a

Work Activity	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
Management	180	382	659	554	393	475	70	762
Teaching	0	14	33	0	0	189	0	270
Basic research	102	61	66	134	27	109	98	340
Applied research	503	99	115	153	96	16	60	546
Development	200	161	435	108	13	209	23	188
Report, technical writing	80	19	304	255	87	85	229	92
Design	0	289	651	369	355	127	10	287
Quality control	118	30	255	256	214	84	19	0
Operations	198	384	699	515	374	133	50	187
Distribution	0	87	412	64	0	46	20	320
Consulting	110	89	36	88	357	160	161	126
Other	550	34	267	208	45	81	73	1,061
Total	2,040	1,649	3,932	2,702	1,963	1,714	813	4,180

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978. *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-16. Primary Work Activity Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a

Work Activity	Energy-Related Activity						
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact
Management	267	127	288	475	188	246	13
Teaching	54	0	38	12	0	55	58
Basic research	232	34	319	153	66	224	194
Applied research	474	133	151	164	169	283	139
Development	265	136	512	115	26	157	9
Report, technical writing	227	91	92	230	84	147	381
Design	93	149	686	493	475	385	61
Quality control	240	97	309	325	40	34	149
Operations	326	607	578	437	496	218	79
Distribution	93	12	299	11	181	108	111
Consulting	44	20	27	102	82	83	92
Other	419	245	184	134	364	424	67
Total	2732	1650	3483	2651	2171	2462	1447

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-17. Annual Salary Versus Major Energy-Related Activity: Energy-Related 1972 Graduates in 1978^a

Annual Salary (Dollars)	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
10,000 or less	116	30	56	97	16	103	0	227
10,100 to 15,000	116	0	221	208	13	107	68	322
15,100 to 20,000	299	251	963	528	541	463	385	1,245
20,100 to 25,000	906	604	1,431	1,033	1,004	806	225	1,379
25,100 to 30,000	330	448	457	551	273	148	74	520
Over 30,000	257	214	160	179	90	57	27	72
Total	2,023	1,548	3,208	2,596	1,936	1,684	780	3,764

Annual Salary (Dollars)	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
10,000 or less	5.7	1.9	1.7	3.7	0.8	6.1	0.0	6.0
10,100 to 15,000	5.7	0.0	6.7	8.0	0.7	6.4	8.7	8.5
15,100 to 20,000	14.8	16.2	29.3	20.3	27.9	27.5	49.4	33.1
20,100 to 25,000	44.8	39.0	43.5	39.8	51.9	47.9	28.9	36.6
25,100 to 30,000	16.3	29.0	13.9	21.2	14.1	8.8	9.5	13.8
Over 30,000	12.7	13.8	4.9	6.9	4.6	3.4	3.5	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-18. Annual Salary Versus Major Energy-Related Activity: Energy-Related 1976 Graduates in 1978^a

Annual Salary (Dollars)	Energy-Related Activity							
	Exploration	Extraction	Manufacturing or Processing	Generation	Transportation or Storage	Conservation	Environmental Impact	Other
10,000 or less	72	121	375	154	149	237	206	738
10,100 to 15,000	714	120	672	215	460	597	518	1,116
15,100 to 20,000	1,050	527	1,479	1,530	974	912	531	1,451
20,100 to 25,000	725	664	659	414	347	423	121	523
25,100 to 30,000	114	102	97	191	111	62	0	152
Over 30,000	0	48	105	67	78	0	0	77
Total	2,676	1,582	3,387	2,571	2,117	2,231	1,375	4,056

Annual Salary (Dollars)	Energy-Related Activity							
	Exploration (Percent)	Extraction (Percent)	Manufacturing or Processing (Percent)	Generation (Percent)	Transportation or Storage (Percent)	Conservation (Percent)	Environmental Impact (Percent)	Other (Percent)
10,000 or less	2.7	7.6	11.1	6.0	7.0	10.6	15.0	18.2
10,100 to 15,000	26.7	7.6	19.8	8.4	21.7	26.7	37.6	27.5
15,100 to 20,000	39.2	33.3	43.7	59.5	46.0	40.9	38.6	35.8
20,100 to 25,000	27.1	42.0	19.5	16.1	16.4	19.0	8.8	12.9
25,100 to 30,000	4.3	6.5	2.9	7.4	5.2	2.8	0.0	3.8
Over 30,000	0.0	3.1	3.1	2.6	3.7	0.0	0.0	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-19. Major Field of Study for Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978

<u>Major</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Engineering					
Chemical	56.4	9.8	10.6	8.1	15.0
Civil	64.1	8.8	9.3	6.5	11.2
Electrical or electronic	55.3	13.8	12.2	8.1	10.6
Mechanical	57.8	12.5	12.1	6.5	11.1
Nuclear, petroleum, or mining	80.5	6.5	1.1	4.3	7.5
Other	57.6	6.1	17.2	10.7	8.3
Total, engineering	60.8	10.2	11.1	7.5	10.4
Science					
Physical	40.5	11.7	21.3	6.9	19.7
Math and computer	68.7	13.5	9.7	0.0	8.1
Environmental	74.2	5.8	5.6	6.6	7.8
Life	58.6	10.4	8.0	18.0	5.0
Psychology and social	52.8	10.4	6.8	15.0	15.0
Total, science	58.6	10.1	10.0	10.1	11.2
Other	29.5	26.9	19.0	10.9	13.7
Total	58.0	11.2	11.2	8.7	10.9

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

Table A-20. Major Field of Study for Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978

<u>Major</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Engineering					
Chemical	43.4	9.1	14.7	15.1	17.7
Civil	69.4	16.0	6.4	4.2	4.0
Electrical or electronic	40.7	12.9	18.8	10.7	16.9
Mechanical	57.0	12.8	9.3	12.1	8.9
Nuclear, petroleum, or mining	76.1	9.4	5.4	3.3	5.9
Other	50.0	20.0	8.1	12.5	9.5
Total, engineering	55.3	13.9	10.3	10.2	10.3
Science					
Physical	48.6	17.2	13.1	6.0	15.1
Math and computer	69.8	7.9	11.4	4.8	6.1
Environmental	74.0	13.1	2.8	4.3	5.9
Life	52.0	7.8	30.7	9.5	0.0
Psychology and social	46.2	18.4	23.8	1.1	10.5
Total, science	56.8	13.5	17.6	4.8	7.5
Other	92.2	7.8	0.0	0.0	0.0
Total	56.5	13.6	13.4	7.6	8.9

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

Table A-21. Occupation Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978

<u>Occupation</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Engineering					
Chemical	54.0	8.7	14.5	8.1	14.7
Civil	65.9	9.7	12.2	4.8	7.4
Electrical or electronic	50.6	8.5	14.6	9.8	16.0
Mechanical	62.1	14.1	7.2	7.2	9.5
Nuclear, petroleum, or mining	83.9	7.3	1.6	2.8	4.5
Other	60.9	11.0	8.0	8.9	11.2
Total, engineering	65.9	10.0	7.7	6.6	9.8
Science					
Physical	46.9	16.9	13.9	6.5	15.8
Math and computer	33.7	18.3	18.3	22.4	7.3
Environmental	79.6	7.0	3.1	6.7	3.6
Life	20.6	9.3	38.5	29.4	2.3
Psychology and social	92.8	5.2	0.0	2.0	0.0
Total, science	55.8	12.0	12.8	12.6	6.6
Other	24.7	15.9	23.3	11.1	24.9
Total	57.5	11.4	11.2	8.8	11.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy
1978 National Survey of Recent Science and Engineering Graduates.

Table A-22. Occupation Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978

<u>Occupation</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Engineering					
Chemical	38.2	9.9	20.2	13.6	18.1
Civil	77.8	12.9	3.3	3.6	2.5
Electrical or electronic	37.3	20.6	18.2	11.2	12.7
Mechanical	52.8	16.0	12.6	12.2	6.3
Nuclear, petroleum, or mining	75.0	8.8	8.9	3.9	3.4
Other	53.7	10.9	6.6	13.2	15.6
Total, engineering	57.2	13.0	11.0	9.7	9.2
Science					
Physical	50.3	20.8	16.2	3.3	9.4
Math and computer	68.4	5.4	16.5	7.1	2.6
Environmental	73.5	13.0	2.2	5.0	6.2
Life	35.4	5.6	44.4	14.7	0.0
Psychology and social	54.9	7.3	31.6	2.7	3.5
Total, science	59.1	11.8	18.3	5.5	5.2
Other	46.5	21.9	13.5	1.9	16.2
Total	56.5	13.6	13.4	7.6	8.9

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

Table A-23. Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978

<u>Highest Degree</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Bachelor's	56.8	9.7	10.2	10.5	12.8
Master's	60.3	13.4	10.8	6.5	9.0
Ph.D. ^a	55.7	11.1	18.1	7.4	7.7

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

^aThe reader should note that the Ph.D.'s included here are only those selected as bachelor's- or master's-degree recipients who have earned doctorates since graduation. The group is very small and does not represent all Ph.D.'s.

Table A-24. Highest Degree Held Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978

<u>Highest Degree</u>	<u>Percent of Time Spent on Energy-Related Activities</u>				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Bachelor's	55.3	13.3	14.3	8.3	8.9
Master's	58.3	14.3	11.8	6.4	9.2
Ph.D. ^a	78.0	14.9	7.1	0.0	0.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, *1978 National Survey of Recent Science and Engineering Graduates*.

^aThe reader should note that the Ph.D.'s included here are only those selected as bachelor's- or master's-degree recipients who have earned doctorates since graduation. The group is very small and does not represent all Ph.D.'s.

Table A-25. Principal Employer Versus Time Spent on Energy-Related Activities: Energy-Related 1972 Graduates in 1978

<u>Employer</u>	Percent of Time Spent on Energy-Related Activities				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Private industry	60.5	11.9	9.4	7.8	10.3
Education	31.5	9.4	21.0	27.9	10.2
Federal government	46.7	4.8	18.5	0.8	29.3
State and local government	55.8	23.5	17.8	3.0	0.0
Non-profit organization	75.6	4.9	19.5	0.0	0.0
Other	62.2	10.9	11.7	15.2	0.0
Total	58.2	11.3	11.2	8.4	11.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

Table A-26. Principal Employer Versus Time Spent on Energy-Related Activities: Energy-Related 1976 Graduates in 1978

<u>Employer</u>	Percent of Time Spent on Energy-Related Activities				
	<u>100</u>	<u>75-99</u>	<u>50-74</u>	<u>25-49</u>	<u>24 or Less</u>
		(Percent of Graduates)			
Private industry	60.9	11.9	10.1	7.1	10.1
Education	38.8	16.2	29.4	10.3	5.2
Federal government	48.8	17.8	12.7	15.5	5.2
State and local government	50.8	8.6	40.6	0.0	0.0
Non-profit organization	32.5	37.5	20.8	5.8	3.4
Other	34.1	51.5	10.8	0.0	3.7
Total	56.5	13.6	13.4	7.6	8.9

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy,
1978 National Survey of Recent Science and Engineering Graduates.

Table A-27. Detailed Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related 1972 Graduates in 1978^d

Major	Occupation					
	Engineering					
	Chemical	Civil	Electrical or Electronic	Mechanical	Nuclear, Petroleum, or Mining	Other Engineering
Engineering						
Chemical	825 (56.8)	0	0	0	141	375
Civil	0	731 (52.7)	31	81	177	157
Electrical or electronic	0	10	1,550 (61.1)	52	191	542
Mechanical	0	0	27	2,111 (63.0)	228	511
Nuclear, petroleum, or mining	19	0	0	103	1,308 (81.5)	90
Other	0	0	186	123	344	1,255 (59.7)
Total, engineering	844	741	1,794	2,470	2,389	2,930
Science						
Physical	76	0	50	23	50	123
Math and computer	0	0	0	36	244	121
Environmental	0	0	0	0	66	27
Life	0	0	7	0	432	147
Psychology and social	0	0	0	0	260	105
Total, science	76	0	57	59	1,052	523
Other	57	10	70	713	16	0
Total	977	752	1,921	3,242	3,459	3,456

Table A-27. Detailed Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related 1972 Graduates in 1978^a (Continued)

Major	Occupation						Total
	Science						
	Physical	Math and Computer	Environmental	Life	Psychology and Social	Other	
Engineering							
Chemical	0	19	0	0	0	92	1,453
Civil	0	17	0	0	0	194	1,389
Electrical or electronic	0	103	0	0	0	87	2,536
Mechanical	0	0	16	36	0	424	3,354
Nuclear, petroleum, or mining	0	0	43	0	0	41	1,605
Other	34	62	0	0	27	71	2,102
Total, engineering	34	201	59	36	27	909	12,439
Science							
Physical	1,066 (61.2)	41	41	0	18	255	1,743
Math and computer	0	614 (44.7)	114	0	0	244	1,374
Environmental	0	0	1,451 (85.7)	0	24	126	1,695
Life	196	0	0	420 (27.9)	0	305	1,508
Psychology and social	0	440	0	0	447 (19.8)	1,007	2,259
Total, science	1,262	1,095	1,606	420	489	1,937	8,579
Other	0	0	0	81	111	1,033 (49.4)	2,090
Total	1,296	1,296	1,666	537	627	3,878	23,106

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTES: Figures in parentheses are the percent of graduates in each degree field who hold jobs in the same field. Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-28. Detailed Comparison of Major Field of Study for Highest Degree
Held and Occupation: Energy-Related 1976 Graduates in 1978^a

Major	Occupation					
	Engineering					
	Chemical	Civil	Electrical or Electronic	Mechanical	Nuclear, Petroleum, or Mining	Other Engineering
Engineering						
Chemical	1,361 (73.9)	0	0	0	205	92
Civil	0	1,323 (68.7)	0	189	185	206
Electrical or electronic	14	0	1,561 (76.7)	29	72	159
Mechanical	12	26	37	2,195 (67.9)	315	469
Nuclear, petroleum, or mining	0	26	42	167	1,242 (77.2)	111
Other	0	110	97	678	172	1,317 (45.4)
Total, engineering	1,387	1,485	1,737	3,258	2,191	2,354
Science						
Physical	53	0	21	39	109	0
Math and computer	0	0	71	76	76	149
Environmental	0	0	33	32	181	121
Life	133	0	0	250	510	13
Psychology and social	0	0	0	139	185	312
Total, science	186	0	125	536	1,061	595
Other	0	0	29	26	9	41
Total	1,573	1,484	1,892	3,820	3,261	2,992

A-34

Table A-28. Detailed Comparison of Major Field of Study for Highest Degree Held and Occupation: Energy-Related 1976 Graduates in 1978^a (Continued)

Major	Occupation						Total
	Science						
	Physical	Math and Computer	Environmental	Life	Psychology and Social	Other	
Engineering							
Chemical	0	41	0	11	0	131	1,842
Civil	0	0	0	22	0	0	1,924
Electrical or electronic	14	14	0	0	29	145	2,036
Mechanical	0	0	0	0	0	178	3,233
Nuclear, petroleum, or mining	0	0	20	0	0	0	1,609
Other	44	101	0	0	0	381	2,899
Total, engineering	58	156	20	33	29	835	13,561
Science							
Physical	1,151 (72.3)	41	47	0	0	130	1,590
Math and computer	0	1,188 (64.0)	40	0	40	216	1,855
Environmental	119	13	1,710 (75.4)	19	39	0	2,267
Life	251	0	112	588 (23.6)	0	636	2,494
Psychology and social	131	32	0	0	963	2,237 (24.1)	4,000
Total, science	1,652	1,274	1,909	607	1,042	3,219	12,206
Other	98	0	39	0	131	0 (0.0)	374
Total	1,807	1,431	1,968	639	1,203	4,054	26,123

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTES: Figures in parentheses are the percent of graduates in each degree field who hold jobs in the same field. Figures may not add to totals due to independent rounding.

^aDue to the small number of respondents in each detailed category, and the large weights assigned to some respondents, the detailed figures in this table are less reliable than the aggregated figures used elsewhere in this report.

Table A-29. Type of Employer by Occupation: Total Versus Energy-Related Recent Graduates and Bachelor's Versus Master's, 1972 Graduates in 1978

Type of Employer	Total					
	All Scientists and Engineers		Engineers		Scientists	
	B.S. (Percent)	M.S.	B.S. (Percent)	M.S.	B.S. (Percent)	M.S.
Private industry	65.5	49.7	80.6	71.7	49.3	34.7
Educational institution	9.4	18.7	1.6	2.4	17.7	29.8
Federal government	9.3	11.9	6.7	14.4	12.1	10.2
State and local government	9.7	9.5	7.4	5.3	12.3	12.4
Non-profit organization	1.7	3.5	1.2	2.0	2.3	4.6
Other	<u>4.3</u>	<u>6.7</u>	<u>2.5</u>	<u>4.2</u>	<u>6.3</u>	<u>8.4</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Type of Employer	Energy-Related					
	All Scientists and Engineers		Engineers		Scientists	
	B.S. (Percent)	M.S.	B.S. (Percent)	M.S.	B.S. (Percent)	M.S.
Private industry	87.7	82.4	88.8	89.3	84.1	67.4
Educational institution	1.3	6.4	0.1	2.2	5.5	15.7
Federal government	3.9	7.1	4.2	4.7	2.7	12.4
State and local government	1.9	2.6	0.6	3.4	6.5	1.0
Non-profit organization	3.7	1.3	4.4	0.4	1.2	3.5
Other	<u>1.5</u>	<u>0.0</u>	<u>1.9</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-30. Type of Employer by Occupation: Total Versus Energy-Related Recent Graduates and Bachelor's Versus Master's, 1976 Graduates in 1978

Type of Employer	Total					
	All Scientists and Engineers		Engineers		Scientists	
	B.S. (Percent)	M.S. (Percent)	B.S. (Percent)	M.S. (Percent)	B.S. (Percent)	M.S. (Percent)
Private industry	58.3	42.7	83.1	69.0	41.4	27.2
Educational institution	14.4	26.3	3.3	9.9	21.9	35.9
Federal government	7.5	9.1	6.2	11.3	8.4	7.9
State and local government	9.8	7.9	4.4	4.5	13.5	9.9
Non-profit organization	3.4	4.8	0.2	1.8	5.6	6.7
Other	<u>6.6</u>	<u>9.2</u>	<u>2.8</u>	<u>3.6</u>	<u>9.1</u>	<u>12.5</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

	Energy-Related					
	B.S.	M.S.	B.S.	M.S.	B.S.	M.S.
Private industry	81.1	70.0	90.0	75.3	59.7	60.9
Educational institution	11.2	15.8	5.9	11.6	24.0	22.9
Federal government	4.1	8.8	3.2	9.1	6.3	8.2
State and local government	1.4	2.5	0.1	0.7	4.5	5.6
Non-profit organization	1.5	2.9	0.1	3.4	5.0	2.0
Other	<u>0.6</u>	<u>0.2</u>	<u>0.7</u>	<u>0.0</u>	<u>0.5</u>	<u>0.5</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-31. Primary Work Activity Involved in the Occupation of Energy-
Related 1972 Graduates: Bachelor's Versus Master's in 1978

<u>Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Bachelor's (Percent)</u>	<u>Master's (Percent)</u>	<u>Bachelor's (Percent)</u>	<u>Master's (Percent)</u>	<u>Bachelor's (Percent)</u>	<u>Master's (Percent)</u>
Management	16.2	21.1	19.7	25.5	3.8	11.3
Teaching	1.9	2.2	1.7	1.6	2.8	3.5
Basic research	0.5	5.1	0.3	0.8	1.3	14.9
Applied research	5.0	10.3	4.3	6.2	7.7	19.4
Development	7.9	7.8	8.8	9.4	4.6	4.2
Report, technical writing	5.9	6.1	6.0	5.2	5.6	8.3
Design	16.0	10.7	19.7	15.5	2.8	0.0
Quality control	9.0	1.6	8.0	1.4	12.7	2.0
Operations	17.4	6.2	21.2	8.1	3.8	2.0
Distribution	2.2	1.5	2.9	2.1	0.0	0.0
Consulting	6.2	6.7	4.3	7.9	13.1	4.2
Other	11.6	20.8	3.2	16.5	41.7	30.3
No answer	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>	<u>0.0</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-32. Primary Work Activity Involved in the Occupation or Energy-Related 1976 Graduates: Bachelors Versus Masters in 1978

Activity	All Scientists and Engineers		Engineers		Scientists	
	Bachelors (Percent)	Masters (Percent)	Bachelors (Percent)	Masters (Percent)	Bachelors (Percent)	Masters (Percent)
Management	10.8	13.5	12.9	17.9	5.8	6.1
Teaching	0.3	3.9	0.0	2.1	1.0	6.9
Basic research	6.3	8.9	1.2	5.2	18.8	15.0
Applied research	8.3	14.3	3.4	9.2	20.4	22.9
Development	7.9	8.4	8.9	9.6	5.5	6.3
Report, technical writing	5.0	9.0	5.3	10.3	4.3	6.7
Design	14.8	11.7	19.7	18.2	2.5	0.9
Quality control	9.5	1.8	10.0	2.4	8.1	0.7
Operations	19.7	4.5	27.1	6.2	1.4	1.7
Distribution	3.1	0.3	3.2	0.0	2.7	0.8
Consulting	2.1	6.6	2.8	9.4	0.5	2.0
Other	12.0	17.0	5.3	9.2	28.7	30.0
No answer	0.2	0.1	0.1	0.1	0.5	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-33. Primary Work Activity Involved in the Occupation of
1972 Graduates: Total Bachelor's Versus Master's in 1978

Activity	All Scientists and Engineers		Engineers		Scientists	
	Bachelor's (Percent)	Master's (Percent)	Bachelor's (Percent)	Master's (Percent)	Bachelor's (Percent)	Master's (Percent)
Management	17.3	19.2	19.7	26.2	14.7	14.4
Teaching	4.2	9.3	0.9	1.4	7.8	14.6
Basic research	4.2	4.9	0.6	0.9	8.1	7.6
Applied research	3.7	7.5	1.7	4.7	5.9	9.4
Development	9.3	10.0	13.0	16.7	5.2	5.4
Report, technical writing	4.2	8.0	5.7	6.5	2.5	9.0
Design	9.5	6.1	16.7	13.9	1.6	0.8
Quality control	6.6	3.6	7.5	4.6	5.5	2.9
Operations	14.6	4.5	22.0	7.8	6.5	2.3
Distribution	2.7	1.5	2.1	1.2	3.5	1.7
Consulting	3.6	4.9	3.6	5.9	3.6	4.3
Other	19.8	19.3	5.9	9.2	35.0	26.4
No answer	0.3	1.3	0.4	1.0	0.2	1.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-34. Primary Work Activity by Occupation of 1976
Graduates: Total Bachelors Versus Masters in 1978

<u>Activity</u>	<u>All Scientists and Engineers</u>		<u>Engineers</u>		<u>Scientists</u>	
	<u>Bachelor's (Percent)</u>	<u>Masters' (Percent)</u>	<u>Bachelor's (Percent)</u>	<u>Masters' (Percent)</u>	<u>Bachelor's (Percent)</u>	<u>Masters' (Percent)</u>
Management	10.7	12.1	10.3	16.7	10.8	9.4
Teaching	4.9	9.6	0.6	1.6	7.8	14.3
Basic research	8.4	10.4	0.8	3.9	13.6	14.3
Applied research	6.6	8.8	3.2	7.8	8.9	9.4
Development	7.7	8.5	12.9	15.2	4.2	4.6
Report, technical writing	7.4	9.3	7.3	10.1	7.5	8.9
Design	8.1	8.1	17.8	18.6	1.4	2.0
Quality control	9.4	3.3	12.3	4.2	7.5	2.4
Operations	12.9	4.4	22.2	6.8	6.6	3.0
Distribution	2.8	0.7	1.5	0.3	3.7	1.0
Consulting	2.2	3.3	3.1	4.8	1.6	2.3
Other	17.9	20.1	7.3	9.0	25.3	26.6
No answer	<u>0.8</u>	<u>1.3</u>	<u>0.4</u>	<u>0.5</u>	<u>1.1</u>	<u>1.8</u>
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to 100.0 percent due to independent rounding.

Table A-35. Major Field of Study for Highest Degree Held
Versus Employment Status: Total 1972 Graduates in 1978^a

Major	Employment Status							
	Full-Time, Science or Engineering	Percent	Full-Time, Non-Science, Non-Engineering	Percent	Part- Time	Percent	Post- Doctoral	Percent
Engineering								
Chemical	3,808	83.9	652	14.3	81	1.8	0	0.0
Civil	7,961	87.8	1,047	11.6	54	0.6	0	0.0
Electrical or electronic	14,891	85.2	2,171	12.4	328	1.9	93	0.5
Mechanical	8,561	80.4	1,986	18.7	95	0.9	0	0.0
Nuclear, petroleum, or mining	2,067	84.2	387	15.8	0	0.0	0	0.0
Other	14,690	72.2	5,344	26.3	183	0.9	108	0.5
Total, engineering	51,978	80.5	11,587	18.0	741	1.1	201	0.3
Science								
Physical	9,152	57.1	5,324	33.2	955	6.0	609	3.8
Math and computer	15,631	57.5	10,287	37.8	1,137	4.2	151	0.6
Environmental	4,668	50.8	3,716	40.4	733	8.0	76	0.8
Life	17,709	38.5	22,615	49.1	3,919	8.5	1,806	3.9
Psychology and social	24,341	19.6	86,163	69.3	12,409	10.0	1,340	1.1
Total, science	71,501	32.1	128,105	57.5	19,153	8.6	3,982	1.8
Other	5,296	4.1	38,627	78.5	423	0.9	2,764	5.6
Total	128,775	38.3	178,319	53.0	22,454	6.7	6,946	2.1

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aAs in Tables 27 and 28, this table includes only employed graduates.

Table A-36. Major Field of Study for Highest Degree Held
Versus Employment Status: Total 1976 Graduates in 1978^a

Major	Employment Status							
	Full-Time, Science or Engineering	Percent	Full-Time, Non-Science, Non-Engineering	Percent	Part- Time	Percent	Post- Doctoral	Percent
Engineering								
Chemical	3,631	83.8	320	7.4	322	7.4	59	1.4
Civil	9,283	88.8	822	7.9	318	3.0	34	0.3
Electrical or electronic	12,981	89.7	889	6.1	529	3.7	70	0.5
Mechanical	8,053	86.6	834	9.0	378	4.1	35	0.4
Nuclear, petroleum, or mining	2,182	86.2	158	6.2	149	5.9	42	1.6
Other	14,887	73.6	4,546	22.5	668	3.3	115	0.6
Total, engineering	51,017	83.2	7,569	12.3	2,364	3.9	355	0.6
Science								
Physical	7,502	54.1	2,065	14.9	3,961	28.6	342	2.5
Math and computer	16,228	65.9	5,871	23.8	2,483	10.1	48	0.2
Environmental	5,760	62.3	2,536	27.4	882	9.5	62	0.7
Life	25,491	38.1	27,904	41.8	12,891	19.3	539	0.8
Psychology and social	25,963	20.1	84,047	65.1	18,704	14.5	375	0.3
Total, science	80,944	33.2	122,423	50.2	38,921	16.0	1,366	0.6
Other	2,055	18.7	7,440	67.9	951	8.7	518	4.7
Total	134,014	42.4	137,430	43.5	42,235	13.3	2,240	0.7

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aAs in Tables 27 and 28, this table includes only employed graduates.

Table A-37. Major Field of Study for Highest Degree Held Versus
Employment Status: Energy-Related 1972 Graduates in 1978^a

Major	Employment Status							
	Full-Time, Science or Engineering	Percent	Full-Time, Non-Science, Non-Engineering	Percent	Part- Time	Percent	Post- Doctoral	Percent
Engineering								
Chemical	1,347	92.7	92	6.4	14	0.9	0	0.0
Civil	1,195	86.0	194	14.0	0	0.0		0.0
Electrical or electronic	2,426	95.7	87	3.4	0	0.0		0.9
Mechanical	2,878	85.8	424	12.6	52	1.6	0	0.0
Nuclear, petroleum, or mining	1,564	97.4	41	2.6	0	0.0	0	0.0
Other	1,942	91.2	98	4.6	62	2.9	27	1.3
Total, engineering	11,353	91.1	936	7.5	128	1.0	50	0.4
Science								
Physical	1,288	73.9	255	14.6	128	7.3	73	4.2
Math and computer	1,130	82.3	244	17.7	0	0.0	0	0.0
Environmental	1,448	85.4	126	7.4	94	5.5	27	1.6
Life	1,066	60.7	544	31.6	136	7.8	0	0.0
Psychology and social	1,252	55.4	1,007	44.6	0	0.0	0	0.0
Total, science	6,184	70.0	2,186	24.8	358	4.1	100	1.1
Other	1,057	50.6	1,033	49.4	0	0.0	0	0.0
Total	18,592	79.5	4,155	17.8	485	2.1	150	0.6

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 *National Survey of Recent Science and Engineering Graduates*.

NOTE: Figures may not add to totals due to independent rounding.

^aAs in Tables 27 and 28, this table includes only employed graduates.

Table A-38. Major Field of Study for Highest Degree Held Versus
Employment Status: Energy-Related 1976 Graduates in 1978^a

Major	Employment Status							
	Full-Time, Science or Engineering	Percent	Full-Time, Non-Science, Non-Engineering	Percent	Part- Time	Percent	Post- Doctoral	Percent
Engineering								
Chemical	1,552	84.3	131	7.1	123	6.7	36	2.0
Civil	1,879	97.6	0	0.0	34	1.8	11	0.6
Electrical or electronic	1,849	90.8	145	7.1	0	0.0	43	2.1
Mechanical	2,962	91.6	178	5.5	92	2.9	0	0.0
Nuclear, petroleum, or mining	1,500	93.3	0	0.0	108	6.7	0	0.0
Other	2,367	81.7	381	13.1	72	2.5	79	2.7
Total, engineering	12,109	89.4	835	6.2	429	3.2	169	1.2
Science								
Physical	974	61.3	130	8.2	486	30.6	0	0.0
Math and computer	1,562	84.2	216	11.6	78	4.2	0	0.0
Environmental	2,156	95.1	0	0.0	110	4.9	0	0.0
Life	1,324	53.1	553	22.2	617	24.7	0	0.0
Psychology and social	1,277	31.9	1,843	46.1	880	22.0	0	0.0
Total, science	7,293	59.7	2,742	22.5	2,171	17.8	0	0.0
Other	359	96.2	0	0.0	14	3.8	0	0.0
Total	19,763	75.7	3,576	13.7	2,616	10.0	168	0.6

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

NOTE: Figures may not add to totals due to independent rounding.

^aAs in Tables 27 and 28, this table includes only employed graduates.

Table A-39. Median Annual Salary: Total Versus Energy-Related 1972 Graduates in 1978, Bachelors

Field	Occupation			Major		
	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total
Engineering						
Chemical	22,000	21,000	1.05	22,900	21,000	1.09
Civil	22,100	19,800	1.12	22,200	19,400	1.14
Electrical or electronic	22,000	21,000	1.05	21,600	21,000	1.03
Mechanical	22,000	21,800	1.01	22,500	20,000	1.13
Nuclear, petroleum, or mining	24,000	21,900	1.10	26,600	22,000	1.21
Other	20,000	19,000	1.05	20,000	19,800	1.01
Total, engineering	21,800	20,000	1.09	21,900	20,000	1.10
Science						
Physical	22,000	16,000	1.38	21,000	16,000	1.31
Math and computer	19,000	17,600	1.08	20,000	18,800	1.06
Environmental	20,000	15,000	1.33	20,000	18,000	1.11
Life ^a	22,500	15,000	1.50	15,600	14,700	1.06
Psychology and social ^a	20,800	15,000	1.39	20,000	14,400	1.39
Total, science	20,000	16,100	1.24	19,500	15,000	1.30
Other	19,000	15,000	1.27	—	—	—
Total	20,800	16,000	1.30	20,800	16,000	1.30

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

^aThere are few energy-related social and life scientists by occupation, and their earnings distribution is bimodal; among life scientists, 48 percent indicated earnings of \$8,000 or less per year, while 52 percent indicated earnings of \$22,500 per year. Fifty-two percent of social scientists indicated earnings of \$20,800 and 48 percent, earnings of \$22,400 per year.

Table A-40. Median Annual Salary: Total Versus Energy-Related 1976 Graduates in 1978, Bachelors

Field	Occupation			Major		
	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total
Engineering						
Chemical	20,000	18,600	1.08	20,500	19,500	1.05
Civil	17,500	16,200	1.08	18,000	16,200	1.11
Electrical or electronic	18,000	17,500	1.03	18,000	17,600	1.02
Mechanical	18,000	17,200	1.05	19,500	18,000	1.08
Nuclear, petroleum, or mining	18,000	17,000	1.06	20,000	18,200	1.10
Other	18,000	16,000	1.13	18,000	16,000	1.13
Total, engineering	18,000	17,000	1.06	18,300	17,000	1.08
Science						
Physical	14,000	12,000	1.17	15,000	11,700	1.28
Math and computer	16,600	15,100	1.10	16,400	15,000	1.09
Environmental	15,000	12,000	1.25	15,000	12,000	1.25
Life	10,500	10,000	1.05	12,000	10,800	1.11
Psychology and social	15,600	10,000	1.56	11,000	10,900	1.01
Total, science	14,300	11,000	1.30	13,700	11,000	1.25
Other	11,800	11,000	1.07	—	—	—
Total	17,000	12,000	1.42	17,000	12,000	1.42

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

Table A-41. Median Annual Salary: Total Versus Energy-Related 1972 Graduates in 1978, Masters

Field	Occupation			Major		
	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total
Engineering						
Chemical	22,000	23,100	0.95	22,000	23,100	0.95
Civil	24,000	23,000	1.04	23,800	23,000	1.03
Electrical or electronic	23,400	24,000	0.98	23,400	24,000	0.98
Mechanical	26,000	24,000	1.08	24,000	23,700	1.01
Nuclear, petroleum, or mining	24,000	24,000	1.00	22,800	23,400	0.97
Other	20,800	22,500	0.92	27,000	24,000	1.13
Total, engineering	24,000	23,400	1.03	23,700	24,000	0.99
Science						
Physical	23,000	18,000	1.28	19,000	17,900	1.06
Math and computer	21,500	20,000	1.08	21,300	20,000	1.07
Environmental	24,000	18,500	1.30	24,000	18,400	1.30
Life	13,400	15,300	0.88	17,000	15,300	1.11
Psychology and social	22,000	16,000	1.38	20,000	16,100	1.24
Total, science	21,500	17,100	1.26	21,300	17,000	1.25
Other	22,000	15,500	1.42	24,000	14,600	1.64
Total	23,000	18,000	1.28	23,000	18,000	1.28

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

Table A-42. Median Annual Salary: Total Versus Energy-Related 1976 Graduates in 1978, Masters

Field	Occupation			Major		
	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total	Energy-Related (Dollars)	Total (Dollars)	Ratio of Energy-Related to Total
Engineering						
Chemical	20,000	20,000	1.00	21,000	20,700	1.01
Civil	19,600	18,500	1.06	20,000	18,500	1.08
Electrical or electronic	20,400	20,000	1.02	20,600	19,700	1.05
Mechanical	20,500	19,800	1.04	20,000	20,000	1.00
Nuclear, petroleum, or mining	21,200	20,700	1.02	20,000	20,000	1.00
Other	20,000	19,000	1.05	21,900	19,800	1.11
Total, engineering	20,000	19,500	1.03	20,400	19,600	1.04
Science						
Physical	10,000	10,900	0.92	9,600	13,000	0.74
Math and computer	18,300	17,000	1.08	17,900	17,600	1.02
Environmental	20,000	18,000	1.11	20,000	17,600	1.14
Life	10,000	12,000	0.83	12,000	12,000	1.00
Psychology and social	15,400	13,000	1.18	15,000	13,000	1.15
Total, science	17,000	13,100	1.30	16,200	13,500	1.20
Other	15,000	15,000	1.00	18,900	15,500	1.22
Total	19,000	15,500	1.23	19,000	15,500	1.23

Source: Westat, Inc./National Science Foundation and U.S. Department of Energy, 1978 National Survey of Recent Science and Engineering Graduates.

APPENDIX B - QUESTIONNAIRE USED IN 1978 NATIONAL SURVEY
OF RECENT SCIENCE AND ENGINEERING GRADUATES

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

Dear Graduate:

We need your help in a major national study of the occupational experiences of recent graduates in Science and Engineering. This project, sponsored by the National Science Foundation and the U.S. Department of Energy, will obtain information from a scientifically chosen sample of 13,000 persons who earned Bachelor's or Master's degrees between July 1, 1975 and June 30, 1976. The sample consists of graduates in engineering and natural, physical, or social science. You are one of those chosen to be in this study.

The purpose of this study is to compile national statistics which will allow an appraisal of the employment and educational characteristics of scientists and engineers graduating in 1975/76.

The resulting information will permit the Federal Government, universities and others to formulate science policies and programs and to make evaluations with regard to the science and engineering manpower potential of the nation.

The questionnaire on the following pages will take about 10-15 minutes of your time to complete, and a postage-paid envelope addressed to Westat, Inc. is enclosed for its return. Westat, Inc. has been selected by the National Science Foundation to assist in carrying out this survey.

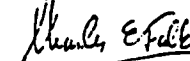
We wish you to know that your completed questionnaire will be seen only by the immediate research staff and will be used for statistical purposes only. In compliance with the Privacy Act of 1974, no personally identifying information will be released to anyone.

We think you will find it interesting and invite your comments on the questionnaire items. In addition, if you have any questions on the survey or need any assistance in completing the questionnaire, please call (collect) Mr. Mark Waksberg or Mr. George K. Schueller at (301) 881-5310.

It would be of great help if you would complete and return the questionnaire within the next five days. If possible, we suggest that you do it now, while you have it in hand. We believe the importance of the study will justify the time you give to it.

The National Science Foundation and the U.S. Department of Energy would greatly appreciate your cooperation in this survey.

Very truly yours,



Charles E. Falk, Director
Division of Science Resources Studies

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be treated as confidential and will be used for statistical purposes only. Information will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary and your failure to provide some or all of the requested information will in no way adversely affect you.

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PG

1978 SURVEY OF RECENT SCIENCE AND ENGINEERING GRADUATES

NATIONAL SCIENCE FOUNDATION AND THE U.S. DEPARTMENT OF ENERGY

DEGREE AND EMPLOYMENT SPECIALTY LIST

Use this list for questions 8 and 15. Find the number corresponding to the appropriate major field and mark it in the space provided in the questionnaire.

AGRICULTURAL SCIENCE

- 001 Agronomy
- 002 Animal/Dairy/Poultry Science
- 003 Horticulture
- 004 Range Management
- 005 Forestry
- 006 Other Agricultural Sciences

BIOLOGICAL SCIENCE

- 007 Anatomy and Histology
- 008 Bacteriology
- 009 Biochemistry
- 010 Biology, General
- 011 Biophysics
- 012 Botany, Plant Pathology
- 013 Entomology
- 014 Genetics
- 015 Immunology
- 016 Marine Science
- 017 Microbiology
- 018 Physiology
- 019 Zoology
- 020 Nutrition (excluding Home Economics)
- 021 Pharmacology
- 022 Other Biological Science

ENGINEERING

- 023 Aeronautical, Aerospace, Astronautical
- 024 Agricultural
- 025 Architectural
- 026 Ceramic
- 027 Chemical
- 028 Civil
- 029 Electrical or Electronic
- 030 Environmental, Sanitary
- 031 General
- 032 Geological
- 033 Industrial
- 034 Mechanical
- 035 Metallurgical, Materials
- 036 Mining
- 037 Nuclear
- 038 Operations Research, Systems
- 039 Petroleum
- 040 Technology (Bachelor's level)
- 041 Other Engineering

PHYSICAL SCIENCE, MATHEMATICAL SCIENCE

- 042 Astronomy
- 043 Atmospheric Science (Meteorology)
- 044 Chemistry
- 045 Computer Science and Data Processing
- 046 Earth Science (Geology, Geophysics)
- 047 Geography
- 048 Mathematics
- 049 Oceanography
- 050 Physics
- 051 Statistics
- 052 Other Physical Sciences

SOCIAL SCIENCE

- 053 Anthropology
- 054 Economics, all fields
- 055 Linguistics
- 056 Political Science (including Government, International Relations)
- 057 Public Administration
- 058 Psychology (all fields except Clinical)
- 059 Social Work, all fields
- 060 Sociology
- 061 Criminology
- 062 Urban Studies
- 063 Other Social Science

ARTS AND HUMANITIES

- 064 Art, Fine and Applied
- 065 English (Language and Literature)
- 066 Foreign Language and Literature
- 067 History
- 068 Journalism, all fields
- 069 Music, all fields
- 070 Philosophy, all fields
- 071 Other Arts and Humanities

BUSINESS

- 072 Accounting
- 073 Business Administration, General
- 074 Finance
- 075 Marketing and Sales
- 076 Management, all fields
- 077 Secretarial Studies
- 078 Other Business

EDUCATION

- 079 Art or Music Education
- 080 Biological Science Education
- 081 Business Education
- 082 Elementary Education
- 083 Engineering Education
- 084 Mathematics Education
- 085 Physical Education or Recreation
- 086 Physical Sciences Education
- 087 Secondary Education
- 088 Science Education, Other
- 089 Special Education
- 090 Other Education

OTHER PROFESSIONS, TECHNICAL FIELDS

- 091 Architecture or Urban Planning
- 092 Clinical Psychology
- 093 Drafting or Design, all fields
- 094 Home Economics
- 095 Health Technology (Medical, Dental, Lab)
- 096 Dentistry
- 097 Medicine or Pre-Medicine
- 098 Nursing
- 099 Pharmacy
- 100 Other Health Professions
- 101 Law or Pre-Law
- 102 Library or Archival Science
- 103 Religion
- 104 Other

OTHER

- | | |
|----------------------------------|-------------------------------------|
| 105 Building Trades | 109 Machine Operation |
| 106 Communications (Radio, TV) | 110 Military Science |
| 107 Crafts (Skilled), all fields | 111 Other, not elsewhere classified |
| 108 Law Enforcement | |

B-3

1978 SURVEY OF RECENT SCIENCE AND ENGINEERING GRADUATES

NATIONAL SCIENCE FOUNDATION AND THE U.S. DEPARTMENT OF ENERGY

1. Date of Birth <div style="border: 1px solid black; width: 100px; height: 20px; margin: 5px 0;"></div> Mo. Day Year	2. Citizenship USA 1 <input type="checkbox"/> Non-USA 2 <input type="checkbox"/> (Specify country): _____	3. Sex Male 1 <input type="checkbox"/> Female 2 <input type="checkbox"/>	9. How many years of professional work experience, including teaching, have you had? (Professional experience includes those work activities in which you have been engaged requiring knowledge of your field at the baccalaureate or equivalent background.) Years <div style="border: 1px solid black; width: 80px; height: 20px; display: inline-block;"></div>
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4. What is your racial background? American Indian or Alaska native 1 <input type="checkbox"/> Asian or Pacific Islander 2 <input type="checkbox"/> Black 3 <input type="checkbox"/> White 4 <input type="checkbox"/>	4a. Is your ethnic heritage Hispanic? Hispanic origin ... 1 <input type="checkbox"/> Not of Hispanic origin ... 2 <input type="checkbox"/>
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5. What is your marital status? Single, never married 1 <input type="checkbox"/> Go to 6 Separated, divorced, or widowed 2 <input type="checkbox"/> Married 3 <input type="checkbox"/>	10. What was your employment status as of the period indicated? (Check only ONE category.) Employed full-time, science or engineering-related position 1 <input type="checkbox"/> Go to 11 Employed full-time, nonscience or nonengineering-related position 2 <input type="checkbox"/> Go to 10a Employed part-time, science or engineering-related position 3 <input type="checkbox"/> Go to 10b Employed part-time, nonscience or nonengineering-related position 4 <input type="checkbox"/> Go to 10b Postdoctoral appointment (fellowship, traineeship, research associateship, etc.) 5 <input type="checkbox"/> Go to 11 Unemployed and seeking employment 6 <input type="checkbox"/> Go to 10a and 10d Not employed and not seeking employment 7 <input type="checkbox"/> Go to 10a Retired and not employed 8 <input type="checkbox"/> Go to 23 Other (Specify): 9 <input type="checkbox"/> Go to 11
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5a. Do you have any children? No .. 1 <input type="checkbox"/> Yes, under age 6 2 <input type="checkbox"/> Yes, 6 years of age or over 3 <input type="checkbox"/>	10a. If you were employed full-time during the week of August 7, 1978, in a position unrelated to science or engineering, what was the MOST important reason for taking the position? Prefer nonscience or nonengineering position 1 <input type="checkbox"/> Promoted out of science or engineering position 2 <input type="checkbox"/> Pay is better 3 <input type="checkbox"/> Locational preference 4 <input type="checkbox"/> } Go to 11 Science or engineering position not available 5 <input type="checkbox"/> Other (Specify): 6 <input type="checkbox"/>
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6. Are you physically handicapped? Yes 1 <input type="checkbox"/> No 2 <input type="checkbox"/> Go to 7	10b. If you were employed part-time during the week of August 7, 1978, were you seeking full-time employment? Yes 1 <input type="checkbox"/> No 2 <input type="checkbox"/> Go to 11
---	---

6a. What is the nature of your handicap(s)? (Mark as many as apply.) Visual 1 <input type="checkbox"/> Auditory 2 <input type="checkbox"/> Orthopedic 3 <input type="checkbox"/> Other (Specify): 4 <input type="checkbox"/>	10c. If you were unemployed and seeking employment during the week of August 7, 1978, was your job search restricted by: Geographic location 1 <input type="checkbox"/> Family responsibilities 2 <input type="checkbox"/> Need for part-time employment 3 <input type="checkbox"/> Other (Specify): 4 <input type="checkbox"/>
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7. Which of the following best describes your enrollment status as of the week of August 7, 1978? (Mark one only.) Not a student 1 <input type="checkbox"/> Graduate student (post baccalaureate) 2 <input type="checkbox"/> Full-time 3 <input type="checkbox"/> Part-time 4 <input type="checkbox"/> Undergraduate student 5 <input type="checkbox"/>	10d. How many weeks, during the period of unemployment ending with the week of August 7, 1978, were you unemployed and seeking work? Weeks <div style="border: 1px solid black; width: 80px; height: 20px; display: inline-block;"></div> Go to 23
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8. List in the table below all undergraduate and graduate degrees, excluding honorary degrees, that have been awarded to you. Please use Specialty List on page 2 for major field and number.				
Type of Degree	Granted		Major Field (Use Specialty List)	
	Month	Year	Name	Number
Bachelor's				
Master's				
Doctorate				
Other (Specify)				

10e. If you were not employed and not seeking work during the week of August 7, 1978, what was the most important reason for not seeking work?

- | | | | |
|--|---|--------------------------|------------|
| Full-time graduate student | 1 | <input type="checkbox"/> | } Go to 23 |
| Temporarily absent for health or personal reasons | 2 | <input type="checkbox"/> | |
| Tending to family responsibilities .. | 3 | <input type="checkbox"/> | |
| Could not find work or believed no job available in my field | 4 | <input type="checkbox"/> | |
| Insufficient financial incentive | 5 | <input type="checkbox"/> | |
| On layoff | 6 | <input type="checkbox"/> | |
| Other (Specify): | 7 | <input type="checkbox"/> | |

11. Which category below best describes the type of organization of your principal employment during the week of August 7, 1978? (Check only ONE category.)

- | | | |
|---|----|--------------------------|
| Business or industry | 01 | <input type="checkbox"/> |
| Junior college, 2-year college, technical institute | 02 | <input type="checkbox"/> |
| Medical school | 03 | <input type="checkbox"/> |
| Four-year college or university other than medical school | 04 | <input type="checkbox"/> |
| Elementary or secondary school system | 05 | <input type="checkbox"/> |
| Hospital or clinic | 06 | <input type="checkbox"/> |
| U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA | 07 | <input type="checkbox"/> |
| U.S. government, civilian employee | 08 | <input type="checkbox"/> |
| State government | 09 | <input type="checkbox"/> |
| Local or other government (Specify): | 10 | <input type="checkbox"/> |
| International agency | 11 | <input type="checkbox"/> |
| Nonprofit organization, other than hospital, clinic, or educational institution | 12 | <input type="checkbox"/> |
| Other (Specify): | 13 | <input type="checkbox"/> |

12. Please give the name of your principal employer (organization, company, etc., or if self-employed, write "self"), and actual place of employment during the week of August 7, 1978.

Name of Employer

City State

13. What percent of working time did you devote to each of the following activities during the week of August 7, 1978?

	Percent
Management or administration of research and development	01
Management or administration of other than research and development	02
Teaching and training -- preparing and teaching courses, guiding and counseling students or trainees	03
Basic research	04
Applied research	05
Development -- product, process, and technical development	06
Report and technical writing, editing, information retrieval	07
Clinical diagnosis	08
Design -- of equipment, processes, models ..	09
Quality control, testing, evaluation, or inspection	10
Operations -- production, maintenance, construction, installation	11
Distribution -- sales, traffic, purchasing, customer and public relations	12
Statistical work -- survey work, forecasting, statistical analysis	13
Consulting	14
Computer applications	15
Other activities (Specify):	16

Total 100%

14. Among all the activities marked above, which was your primary and which was your major secondary activity? (Fill in the appropriate code numbers -- 01 to 16 -- from Q. 13.)

Primary work activity ☐ ☐

Major secondary work activity ☐ ☐

15. From the Degree and Employment Specialties List on page 2, select and enter both the number and title of the specialty most closely related to your principal employment during the week of August 7, 1978. Please write in your specialty if it is not on the list.

Number	Type of Specialty

16. What was the basic annual salary* associated with your principal professional employment during the week of August 7, 1978?

\$ per year

*NOTE: Basic annual salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

- 16a. Were you academically employed? Yes ... 1 ☐ Go to 16b and 16c
No 2 ☐ Go to 17

- 16b. Check whether salary was for: 9-10 months 1 ☐
11-12 months 2 ☐

- 16c. What was the title of your position?

Professor	1	<input type="checkbox"/>
Associate professor	2	<input type="checkbox"/>
Assistant professor	3	<input type="checkbox"/>
Instructor	4	<input type="checkbox"/>
Lecturer	5	<input type="checkbox"/>
Teaching assistant	6	<input type="checkbox"/>
Research assistant	7	<input type="checkbox"/>
Other (Specify):	8	<input type="checkbox"/>

17. Was any of your work in the week of August 7, 1978 supported by U.S. government funds? Yes ... 1 ☐ Go to 17a
No 2 ☐ Go to 18
Don't know.. 3 ☐

- 17a. IF YES to 17, which of the following federal agencies or departments were supporting the work? (Check all that apply.)

Agency for International Development	01	<input type="checkbox"/>
Environmental Protection Agency	02	<input type="checkbox"/>
National Aeronautics and Space Administration	03	<input type="checkbox"/>
National Endowment for the Arts	04	<input type="checkbox"/>
National Endowment for the Humanities	05	<input type="checkbox"/>
National Science Foundation	06	<input type="checkbox"/>
Nuclear Regulatory Commission	07	<input type="checkbox"/>
Smithsonian Institution	08	<input type="checkbox"/>
Department of Agriculture	09	<input type="checkbox"/>
Department of Commerce	10	<input type="checkbox"/>
Department of Defense	11	<input type="checkbox"/>
Department of Energy	12	<input type="checkbox"/>
Department of Health, Education, and Welfare:		
National Institutes of Health	13	<input type="checkbox"/>
Alcohol, Drug Abuse, and Mental Health Administration	14	<input type="checkbox"/>
National Institutes of Education	15	<input type="checkbox"/>
Office of Education	16	<input type="checkbox"/>
Other (Specify):	17	<input type="checkbox"/>
Department of Housing and Urban Development ..	18	<input type="checkbox"/>
Department of the Interior	19	<input type="checkbox"/>
Department of Justice	20	<input type="checkbox"/>
Department of Labor	21	<input type="checkbox"/>
Department of State	22	<input type="checkbox"/>
Department of Transportation	23	<input type="checkbox"/>
Other agency or department (Specify):	24	<input type="checkbox"/>
Don't know source agency	25	<input type="checkbox"/>

18. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in the week of August 7, 1978, please check the box for the ONE on which you spent the MOST time.

Energy and fuel	01	<input type="checkbox"/>	Go to 19
Health	02	<input type="checkbox"/>	
Defense	03	<input type="checkbox"/>	
Environmental protection, pollution control	04	<input type="checkbox"/>	Go to 23
Education	05	<input type="checkbox"/>	
Space	06	<input type="checkbox"/>	
Crime prevention and control	07	<input type="checkbox"/>	
Food and other agricultural products	08	<input type="checkbox"/>	
Natural resources, other than fuel or food	09	<input type="checkbox"/>	
Community development and services ..	10	<input type="checkbox"/>	
Housing (planning, design, construction)	11	<input type="checkbox"/>	
Transportation, communications	12	<input type="checkbox"/>	
Cultural life	13	<input type="checkbox"/>	
Other area (Specify):	14	<input type="checkbox"/>	
Does not apply	88	<input type="checkbox"/>	

APPENDIX C - QUESTIONNAIRE USED IN 1976 NATIONAL SURVEY
OF RECENT SCIENCE AND ENGINEERING GRADUATES

NATIONAL SCIENCE FOUNDATION

WASHINGTON, D.C. 20550

Dear Graduate:

We need your help in a major national study of the occupational experiences of recent college graduates in Science and Engineering. This project, sponsored by the National Science Foundation will obtain information from a scientifically chosen sample of 16,000 persons who earned Bachelor's or Master's degrees between July 1, 1973 and June 30, 1975. You are one of those chosen to be in this study.

The purpose of this study is to compile national statistics which will allow an appraisal of the employment and educational characteristics of scientists and engineers graduating since 1973. The resulting information will permit the Federal Government, universities and others to formulate science policies and programs and to make evaluations with regard to the science and engineering manpower potential of the nation.

The questionnaire on the following pages will take about 10-15 minutes of your time to complete, and a postage-paid envelope addressed to Westat, Inc. is enclosed for its return. Westat, Inc. has been selected by the National Science Foundation to assist in carrying out this survey.

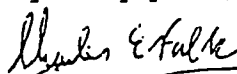
We wish you to know that your completed questionnaire will be seen only by the immediate research staff and will be used for statistical purposes only. In compliance with the Privacy Act of 1974, no personally identifying information will be released to anyone.

We think you will find it interesting and invite your comments on the questionnaire items. In addition, if you have any questions on the survey or need any assistance in completing the questionnaire, please call (collect) Mr. Mark Waksberg or Mr. George K. Schueller at (301) 881-5310.

It would be of great help if you would complete and return the questionnaire within the next five days. If possible, we suggest that you do it now, while you have it in hand. We believe the importance of the study will justify the time you give to it.

The National Science Foundation would greatly appreciate your cooperation in this survey.

Very truly yours,



Charles E. Falk, Director
Division of Science Resources Studies

This information is solicited under the authority of the National Science Foundation Act of 1950, as amended. All information you provide will be treated as confidential and will be used for statistical purposes only. Information will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary and your failure to provide some or all of the requested information will in no way adversely affect you.

1976 NATIONAL SURVEY OF RECENT SCIENCE AND ENGINEERING GRADUATES
NATIONAL SCIENCE FOUNDATION

DEGREE AND EMPLOYMENT SPECIALTY LIST

Use this list for Questions 5 and 9. Find the number corresponding to the appropriate major field and mark it in the space provided in the questionnaire.

BIOLOGICAL SCIENCE

- 01 Agriculture, all fields
- 02 Anatomy and histology
- 03 Bacteriology
- 04 Biochemistry
- 05 Biology (general)
- 06 Biophysics
- 07 Botany, horticulture, plant pathology
- 08 Entomology
- 09 Forestry, all kinds
- 10 Genetics
- 11 Immunology
- 12 Marine/animal or life science
- 13 Microbiology
- 14 Physiology
- 15 Zoology
- 16 Other biological science

ENGINEERING

- 17 Aeronautical, aerospace, astronautical
- 18 Agricultural
- 19 Architectural
- 20 Chemical
- 21 Civil
- 22 Electrical or electronic
- 23 Environmental, sanitary
- 24 General
- 25 Industrial
- 26 Mechanical
- 27 Metallurgical, material
- 28 Mining, geol., petro.
- 29 Nuclear
- 30 Operations research, systems
- 31 Technology
- 32 Other engineering

PHYSICAL SCIENCE MATHEMATICS

- 33 Astronomy
- 34 Atmospheric science (meteorology)
- 35 Chemistry
- 36 Computer science and data processing
- 37 Earth science (geology, geophysics)
- 38 Geography
- 39 Mathematics
- 40 Oceanography
- 41 Physics
- 42 Statistics
- 43 Other physical sciences

SOCIAL SCIENCE

- 44 Anthropology
- 45 Economics, all fields
- 46 Linguistics
- 47 Political science (incl. government, international relations)
- 48 Public administration
- 49 Psychology (all fields except clinical)
- 50 Social work, all fields
- 51 Sociology
- 52 Other social science

ARTS AND HUMANITIES

- 53 Art, fine and applied
- 54 English (language and literature)
- 55 Foreign language and literature
- 56 History
- 57 Journalism, all fields
- 58 Music, all fields
- 59 Philosophy, all fields

BUSINESS

- 60 Accounting
- 61 Business Administration (general)
- 62 Finance
- 63 Marketing and sales
- 64 Management, all fields
- 65 Secretarial studies
- 66 Other business

EDUCATION

- 67 Art or music
- 68 Biological sciences
- 69 Business
- 70 Elementary
- 71 Mathematics
- 72 Physical education or recreation
- 73 Physical sciences
- 74 Secondary
- 75 Science education, other
- 76 Special education
- 77 Other education

PROFESSIONS, TECHNICAL FIELDS

- 78 Architecture or urban planning
- 79 Clinical psychology
- 80 Dentistry
- 81 Drafting or design, all fields
- 82 Home economics
- 83 Health technology (med., dental or lab.)
- 84 Law or pre-law
- 85 Library or archival science
- 86 Medicine or pre-medicine
- 87 Nursing
- 88 Pharmacy
- 89 Religion
- 90 Other health professions
- 91 Other

OTHER

- 92 Building trades
- 93 Communications (radio, T.V.)
- 94 Crafts (skilled), all fields
- 95 Law enforcement
- 96 Machine operation
- 97 Military science
- 98 Other, not elsewhere classified
- 99 Undecided

TC-62 102

11. Please give the name of your principal employer (organization, company, etc., or, if self-employed write "self"), and actual place of employment.

Name of Employer

City State Zip Code

12. What was the basic annual salary* associated with your principal professional employment during the week of June 7, 1976 ?

\$ _____ per year.

*NOTE: Basic annual salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

If academically employed:

- a. Check whether salary was for 9-10 months ☐
or 11-12 months ☐.

- b. What was the title of your position?

Professor 1 ☐
Associate Professor 2 ☐
Assistant Professor 3 ☐
Instructor 4 ☐
Lecturer 5 ☐
Teaching Assistant 6 ☐
Research Assistant 7 ☐
Other (Specify): 8 ☐

Does not apply. 9 ☐

13. Listed below are selected topics of critical national interest. If you devoted a significant proportion of your professional time to any of these problem areas in the week of June 7, 1976, please check the box for the one on which you spent the MOST time.

Education: 1 ☐
Teaching 1 ☐
Other 2 ☐
Health 3 ☐
Defense 4 ☐
Environmental protection, pollution control 5 ☐
Space 6 ☐
Crime prevention and control 7 ☐
Food production and technology 8 ☐
Energy and fuel 9 ☐
Other mineral resources 10 ☐
Community development and services 11 ☐
Housing (planning, design, construction) 12 ☐
Transportation 13 ☐
Other (Specify): 88 ☐
None of the above 14 ☐

14. Was any of your work in the week of June 7, 1976 supported by U.S. Government funds?

Yes. 1 ☐ Go to 14a
No 2 ☐ Go to 15
Don't Know 3 ☐

- 14a. If yes, which of the following Federal agencies or departments were supporting the work? (CHECK ALL THAT APPLY.)

NASA 31 ☐
National Science Foundation 32 ☐
Environmental Protection Agency 33 ☐
Energy Research and Development Administration (AEC) 34 ☐
Nuclear Regulatory Commission 35 ☐
Agency for International Development 36 ☐
Department of Interior 37 ☐
National Institutes of Health, HEW 38 ☐
Alcohol, Drug Abuse and Mental Health Administration, HEW 39 ☐
Office of Education, HEW 40 ☐
Other HEW, (Specify): 41 ☐

Department of Defense 42 ☐
Department of Commerce 43 ☐
Department of Agriculture 44 ☐
Department of Transportation 45 ☐
Department of Justice 46 ☐
Department of Housing and Urban Development 47 ☐
Other agency or department (Specify): 48 ☐

Don't know source agency 49 ☐

15. How many years of professional work experience, including teaching, have you had? (Professional experience includes those work activities in which you have been engaged requiring knowledge of your field at the baccalaureate or equivalent background.)

_____ Years

16. Which of the following best describes your current enrollment status? (MARK ONE ONLY.)

Not a student 1 ☐
Graduate student (post baccalaureate):
Full-time 2 ☐
Part-time 3 ☐

THANK YOU FOR YOUR COOPERATION. PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE ENCLOSED POSTAGE PAID ENVELOPE.

APPENDIX D - QUESTIONNAIRE USED IN THE 1976 NATIONAL SURVEY
OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS

FORM PMS-26A (100-20-770)		U.S. DEPARTMENT OF COMMERCE BUREAU OF THE CENSUS		NOTICE - Your report to the Census Bureau is confidential. It may be seen only by sworn Census employees and may be used only for statistical purposes.	
1976 NATIONAL SURVEY OF NATURAL AND SOCIAL SCIENTISTS AND ENGINEERS					
				Please read instructions carefully before answering questions. Answer as accurately as you can by printing your reply clearly or by entering an "X" in the box next to the appropriate reply. When the instructions for a question direct you to enter a code and description from a list, please refer to the reference list attached to this questionnaire.	
A. Is the information shown in the mailing label above correct? <input type="checkbox"/> YES <input type="checkbox"/> NO - Please enter the correct information		Name Number and street City or town <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> State (if USA) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ZIP code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Foreign country <input type="text"/>			
B. Is this mailing address the same address as your place of residence? <input type="checkbox"/> SAME <input type="checkbox"/> DIFFERENT - Please enter your city and State or foreign country of residence.		City or town <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> State (if USA) <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> ZIP code <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> Foreign country <input type="text"/>			
<p>Dear Friend:</p> <p>Thank you for your continued cooperation in the National Sample of Scientists and Engineers, a series of biennial surveys sponsored by the National Science Foundation and conducted by the Bureau of the Census. From this series, a comprehensive picture of the development and utilization of America's scientists and engineers is being obtained. And, since the surveys include a sample of persons from various other fields, in addition to science and engineering, a valuable measure of the employment and skills among the highly educated population in general has been gained. Statistical data from these surveys are used for planning and analysis by Federal and State manpower agencies, private businesses, nonprofit research organizations, industrial and trade associations, and universities. Your cooperation, of course, has been an essential element in the success of this program.</p> <p>To extend the value of past surveys, the National Science Foundation has asked the Bureau to survey this sample of persons once again to collect current employment information and related data. This is the most reliable and least costly way to learn, for example, how the employment of highly trained persons is affected by fluctuations in the economy. For the survey to be successful and yield truly representative information, it is important that each person fill out and return the questionnaire.</p> <p>Please complete the questions which follow on pages 2 through 4 and return your questionnaire in the enclosed preaddressed envelope. For some questions you are instructed to enter a code and description from Reference List A, B, or C. These lists are attached to the questionnaire.</p> <p>This information is being collected under the authority of the National Science Foundation Act of 1950, as amended. The information you provide is confidential and may be seen only by sworn employees of the Bureau of the Census. The information cannot be used for anything but statistical purposes and cannot be given to any other Government agency, private concern, or individual. The data will be released only in the form of statistical summaries from which it will be impossible to identify information about any particular person. Your response is entirely voluntary and your failure to provide some or all of the requested information will in no way adversely affect you.</p> <p>Thank you for your cooperation.</p> <p>Sincerely,</p> <p><i>Vincent P. Barabba</i></p> <p>VINCENT P. BARABBA Director Bureau of the Census</p> <p>Enclosure</p>					

PART I - EDUCATION AND TRAINING				
1. EDUCATION FROM 1972 TO THE PRESENT a. Since January 1972 have you attended any college, university, or other post high school institution? <input checked="" type="checkbox"/> 1 Yes - Continue with 1b <input type="checkbox"/> 2 No - Skip to question 2				
b. List below each institution from which you have obtained (since January 1972) or are currently obtaining formal training beyond the high school level, and give the other information requested. Begin with the most recent and work back through January 1972. Use a separate row for each degree granted or worked for. Designate degrees by abbreviation (e.g., A.A., B.A., M.A., Ph.D., LL.B., M.D., etc.).				
MOST RECENT	College, university, or other post high school institution (Enter Name and State or foreign country)	Type of degree worked for, if any (Enter Ph.D., M.A., B.A., A.A., etc. or mark "None" box)	Major field of study (Enter code and description from Reference List A)	Year degree was awarded or will be awarded. (Enter year or mark "None" box)
1	010 [] [] [] [] Name _____ State or foreign country _____	014 [] [] OR <input type="checkbox"/> None	015 [] [] [] [] - Code Description _____	016 19 ____ OR <input type="checkbox"/> None
2ND TO LAST	017 [] [] [] [] Name _____ State or foreign country _____	018 [] [] OR <input type="checkbox"/> None	019 [] [] [] [] - Code Description _____	020 19 ____ OR <input type="checkbox"/> None
3RD TO LAST	021 [] [] [] [] Name _____ State or foreign country _____	022 [] [] OR <input type="checkbox"/> None	023 [] [] [] [] - Code Description _____	024 19 ____ OR <input type="checkbox"/> None
2. OTHER TRAINING RECEIVED IN 1974 OR 1975 Aside from formal education, which of the following types of training did you receive in 1974 or 1975? Mark the appropriate year for each type of training you have received.				
		1. On-the-job training 2. Military training applicable to civilian occupations 3. Extension or correspondence courses 4. Courses at employer's training facility 5. Courses at adult education center 6. Other training 7. None	025 1974 [] [] [] [] 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/>	026 1975 [] [] [] [] 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/>
PART II - EMPLOYMENT STATUS				
PLEASE NOTE that in items 3a-5 information is requested for both the current year, as of the week of February 8-14, 1976, and last year, as of the week of February 9-15, 1975. Please answer applicable questions in column (A), then in column (B).				
		Week of February 8-14, 1976 (A)	Week of February 9-15, 1975 (B)	
3a. What was your employment status as of the week indicated?	027	<input type="checkbox"/> 1 Employed full time - Skip to 4a <input type="checkbox"/> 2 Employed part time - Answer 3b <input type="checkbox"/> 3 On post doctoral appointment (fellowship, traineeship, research associate, etc.) - Skip to 4a <input type="checkbox"/> 4 Unemployed and seeking work - Go to column (B) <input type="checkbox"/> 5 Not employed and not seeking work - Skip to 5	028	<input type="checkbox"/> 1 Employed full time - Skip to 4a <input type="checkbox"/> 2 Employed part time - Answer 3b <input type="checkbox"/> 3 On post doctoral appointment (fellowship, traineeship, research associate, etc.) - Skip to 4a <input type="checkbox"/> 4 Unemployed and seeking work - Go to Part III <input type="checkbox"/> 5 Not employed and not seeking work - Skip to 5
b. If you worked part time, were you seeking full-time work?	029	<input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No } Continue with 4a	030	<input type="checkbox"/> 1 Yes <input type="checkbox"/> 2 No } Continue with 4a
4a. Were you working in a position related to science or engineering?	031	<input type="checkbox"/> 1 Yes - Go to top of column (B) <input type="checkbox"/> 2 No - Answer 4b	032	<input type="checkbox"/> 1 Yes - Go to Part III <input type="checkbox"/> 2 No - Answer 4b
b. What was the most important reason for taking this position?	033	MARK ONLY ONE BOX <input type="checkbox"/> 1 Preferred nonscience or nonengineering position <input type="checkbox"/> 2 Promoted out of science or engineering position <input type="checkbox"/> 3 Pay was better in nonscience or nonengineering position <input type="checkbox"/> 4 Locational preference <input type="checkbox"/> 5 Science or engineering position not available <input type="checkbox"/> 6 Other - Specify _____ (Go to top of column B)	034	MARK ONLY ONE BOX <input type="checkbox"/> 1 Preferred nonscience or nonengineering position <input type="checkbox"/> 2 Promoted out of science or engineering position <input type="checkbox"/> 3 Pay was better in nonscience or nonengineering position <input type="checkbox"/> 4 Locational preference <input type="checkbox"/> 5 Science or engineering position not available <input type="checkbox"/> 6 Other - Specify _____ (Go to Part III)
5. If you were not employed and not seeking work, were you principally	035	MARK ONLY ONE BOX <input type="checkbox"/> 1 Retired <input type="checkbox"/> 2 Other - Specify _____ (Go to top of column B)	036	MARK ONLY ONE BOX <input type="checkbox"/> 1 Retired <input type="checkbox"/> 2 Other - Specify _____ (Go to Part III)
PART III - JOB ACTIVITIES				
INSTRUCTIONS FOR COMPLETING QUESTIONS 6-16b				
a. Complete column (A) for questions 6-16b for the job held during the week of February 8-14, 1976 or for your most recent prior job held. b. Column (B) should be completed only if the job you had during the week of February 9-15, 1975 differed from the job described in column (A). If the job was the same, mark the "YES" box at the top of column (B). NOTE: Consider a change of jobs to have occurred if (1) you changed employers; or (2) you remained with the same employer but there were significant changes in duties, levels of responsibility, or occupation; or (3) you worked at a different institution while on sabbatical leave from a college or university. c. If you held more than one job during the weeks mentioned above, please report only the job at which you worked the greatest number of hours.				
6. Where did you work? Write in city and State or foreign country of company, business, agency, or other employer.	Job held during week of February 8-14, 1976 or most recent prior job		Job held during week of February 9-15, 1975 Was this the same job as entered in column (A)?	
	(A)		(B)	
	037 [] [] [] [] City _____ State or foreign country _____		038 [] [] [] [] City _____ State or foreign country _____	
	039 [] [] [] [] City _____ State or foreign country _____		040 [] [] [] [] City _____ State or foreign country _____	

PART III - JOB ACTIVITIES - Continued		
	Job held during week of February 8-14, 1975 or most recent prior job (A)	Job held during week of February 9-15, 1975 (B)
7. What kind of business was this? Enter code and description from Reference List B.	042 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CODE Description _____	043 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CODE Description _____
8. What was your occupation? Enter code and description from Reference List C.	044 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CODE Description _____	045 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> CODE Description _____
9. What work activities were related to this position? Mark all activities in which you spent time.	046 <input type="checkbox"/> Management or administration of research and development <input type="checkbox"/> Management or administration of other than research and development <input type="checkbox"/> Teaching and training - preparing and teaching courses, guiding and counseling students or trainees <input type="checkbox"/> Basic research <input type="checkbox"/> Applied research <input type="checkbox"/> Development - product, process, and technical development <hr/> 048 <input type="checkbox"/> Report and technical writing, editing, information retrieval <input type="checkbox"/> Clinical diagnosis <input type="checkbox"/> Design - of equipment, processes, models <input type="checkbox"/> Quality control, testing, evaluation, or inspection <hr/> 050 <input type="checkbox"/> Operations - production, maintenance, construction, installation <input type="checkbox"/> Distribution - sales, traffic, purchasing, customer and public relations <input type="checkbox"/> Statistical work - survey work, forecasting, statistical analysis <hr/> 052 <input type="checkbox"/> Consulting <input type="checkbox"/> Computer applications <input type="checkbox"/> Other activities - Specify _____	047 <input type="checkbox"/> Management or administration of research and development <input type="checkbox"/> Management or administration of other than research and development <input type="checkbox"/> Teaching and training - preparing and teaching courses, guiding and counseling students or trainees <input type="checkbox"/> Basic research <input type="checkbox"/> Applied research <input type="checkbox"/> Development - product, process, and technical development <hr/> 049 <input type="checkbox"/> Report and technical writing, editing, information retrieval <input type="checkbox"/> Clinical diagnosis <input type="checkbox"/> Design - of equipment, processes, models <input type="checkbox"/> Quality control, testing, evaluation, or inspection <hr/> 051 <input type="checkbox"/> Operations - production, maintenance, construction, installation <input type="checkbox"/> Distribution - sales, traffic, purchasing, customer and public relations <input type="checkbox"/> Statistical work - survey work, forecasting, statistical analysis <hr/> 053 <input type="checkbox"/> Consulting <input type="checkbox"/> Computer applications <input type="checkbox"/> Other activities - Specify _____
10. Among all the activities marked above which was your primary and which was your major secondary activity? Fill in the appropriate code numbers (1 to 18) from question 9.	CODE 054 _____ Primary 056 _____ Secondary	CODE 055 _____ Primary 057 _____ Secondary
11. What percent of working time did you devote to each of the following activities? PLEASE NOTE Basic research is study directed toward gaining scientific knowledge primarily for its own sake. Applied research is study directed toward gaining scientific knowledge in an effort to meet a recognized need. Development is direction of the knowledge gained from research toward production of useful materials, devices, systems, and methods. Entries in each column should sum to 100%.	058 _____ % Management or administration of research and development 060 _____ % Management or administration of other than research and development 062 _____ % Basic research 064 _____ % Applied research 066 _____ % Development 068 _____ % Design 070 _____ % Teaching 072 _____ % Consulting 074 _____ % Other - Specify _____ 100% TOTAL	059 _____ % Management or administration of research and development 061 _____ % Management or administration of other than research and development 063 _____ % Basic research 065 _____ % Applied research 067 _____ % Development 069 _____ % Design 071 _____ % Teaching 073 _____ % Consulting 075 _____ % Other - Specify _____ 100% TOTAL
12. Which category best describes the type of organization of your principal employment or post doctoral appointment?	076 MARK ONLY ONE BOX <input type="checkbox"/> Business or industry <input type="checkbox"/> Junior college, 2-year college, technical institute <input type="checkbox"/> Medical school <input type="checkbox"/> 4-year college or university, other than medical school <input type="checkbox"/> Elementary or secondary school system <input type="checkbox"/> Hospital or clinic <input type="checkbox"/> Non-profit organization, other than hospital, clinic, or educational institution <input type="checkbox"/> U.S. military service, active duty, or Commissioned Corps, e.g. USPHS, NOAA <input type="checkbox"/> U.S. Government, civilian employee <input type="checkbox"/> State government <input type="checkbox"/> Local or other government - Specify _____ <input type="checkbox"/> International agency <input type="checkbox"/> Self-employed <input type="checkbox"/> Other - Specify _____	077 MARK ONLY ONE BOX <input type="checkbox"/> Business or industry <input type="checkbox"/> Junior college, 2-year college, technical institute <input type="checkbox"/> Medical school <input type="checkbox"/> 4-year college or university, other than medical school <input type="checkbox"/> Elementary or secondary school system <input type="checkbox"/> Hospital or clinic <input type="checkbox"/> Non-profit organization, other than hospital, clinic, or educational institution <input type="checkbox"/> U.S. military service, active duty, or Commissioned Corps, e.g. USPHS, NOAA <input type="checkbox"/> U.S. Government, civilian employee <input type="checkbox"/> State government <input type="checkbox"/> Local or other government - Specify _____ <input type="checkbox"/> International agency <input type="checkbox"/> Self-employed <input type="checkbox"/> Other - Specify _____

PART III - JOB ACTIVITIES - Continued					
Job held during week of February 8-14, 1976 or most recent prior job (A)		Job held during week of February 9-15, 1975 (B)			
13. Between what dates did you hold this position? <i>Enter month and year</i>	078 From	079 To	OR Present 080 From 081 To		
14. What was the basic salary associated with this position? If you were on a post doctoral appointment, include stipend plus allowances. (Basic salary refers to salary before deductions for income tax, social security, retirement, etc. but does not include bonuses, overtime, summer teaching, or other payment for secondary jobs.)	082 \$ _____ .00 084 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 086 1. 9-10 months 2. 11-12 months	083 \$ _____ .00 085 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 087 1. 9-10 months 2. 11-12 months			
15. During the previous year (1975 for Column A, 1974 for Column B), what was the basic salary associated with this position?	088 1. Did not hold this job in 1975 - Skip to 16a 090 \$ _____ .00 in 1975 092 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 094 1. 9-10 months 2. 11-12 months	089 1. Did not hold this job in 1974 - Skip to 16a 091 \$ _____ .00 in 1974 093 1. Per year 2. Per month 3. Per week If academically employed, mark whether salary is for - 095 1. 9-10 months 2. 11-12 months			
16a. Was ANY of your work supported or sponsored by U.S. Government funds?	096 1. Yes - Continue with 16b 2. No - Skip to 17a 3. Don't know	097 1. Yes - Continue with 16b 2. No - Skip to 17a 3. Don't know			
b. Which of the following agencies or departments were supporting the work? Mark as many as apply	098 1. Department of Housing and Urban Development 2. Department of the Interior 3. Department of Labor 4. Department of Defense 5. Department of Commerce 6. Department of Agriculture 100 7. Department of Transportation 8. Department of Justice 9. Department of Health, Education, and Welfare 10. NIH (National Institutes of Health) 11. Alcohol and Drug Abuse Mental Health Administration 102 12. Office of Education 13. Other H.E.W. - Specify _____ 104 14. NASA (National Aeronautic and Space Administration) 106 15. NSF (National Science Foundation) 108 16. EPA (Environmental Protection Agency) 110 17. ERDA (Energy Research and Development Administration) 112 18. Nuclear Regulatory Commission 114 19. AID (Agency for International Development) 116 20. Other agency or department - Specify _____ 118 21. Don't know source agency	099 1. Department of Housing and Urban Development 2. Department of the Interior 3. Department of Labor 4. Department of Defense 5. Department of Commerce 6. Department of Agriculture 101 7. Department of Transportation 8. Department of Justice 9. Department of Health, Education, and Welfare 10. NIH (National Institutes of Health) 11. Alcohol and Drug Abuse Mental Health Administration 103 12. Office of Education 13. Other H.E.W. - Specify _____ 105 14. NASA (National Aeronautic and Space Administration) 107 15. NSF (National Science Foundation) 109 16. EPA (Environmental Protection Agency) 111 17. ERDA (Energy Research and Development Administration) 113 18. Nuclear Regulatory Commission 115 19. AID (Agency for International Development) 117 20. Other agency or department - Specify _____ 119 21. Don't know source agency			
PART IV - OTHER INFORMATION					
17a. At anytime during calendar year 1975 were you without a job AND actively seeking employment?	119 1. Yes - Continue with 17b 2. No - Skip to question 18				
b. For how many weeks were you seeking employment?	121 1. 1 to 4 weeks 2. 5 to 10 weeks 3. 11 to 14 weeks 4. 15 to 26 weeks 5. 27 weeks or more				
18. How many years of professional experience, including teaching, have you had? Enter number of years	122 _____ Years				
19. Based on your total education and experience, what do you regard yourself as professionally? Enter code and description from Reference List C.	123 [] CODE Description				
20. Listed at the right are selected topics of critical national interest. If you devote a significant proportion of your professional time to any of these problem areas, please mark the box for the one on which you spend the MOST time.	124 <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> 01 Health 02 Education 03 Teaching 04 Other 05 Environment protection, pollution control 06 Space 07 National defense 08 Crime prevention and control </td> <td style="width: 50%; vertical-align: top;"> 09 Food production and technology 10 Energy and fuel 11 Other mineral resources 12 Community development and services 13 Housing planning, design, construction 14 Does not apply </td> </tr> </table>			01 Health 02 Education 03 Teaching 04 Other 05 Environment protection, pollution control 06 Space 07 National defense 08 Crime prevention and control	09 Food production and technology 10 Energy and fuel 11 Other mineral resources 12 Community development and services 13 Housing planning, design, construction 14 Does not apply
01 Health 02 Education 03 Teaching 04 Other 05 Environment protection, pollution control 06 Space 07 National defense 08 Crime prevention and control	09 Food production and technology 10 Energy and fuel 11 Other mineral resources 12 Community development and services 13 Housing planning, design, construction 14 Does not apply				
21. In the event that it is necessary to contact you to clarify some of the information you provided, may we contact you by telephone? Yes - Enter number(s) on which you can be reached → No					
22. Please enter the name of a person at an address other than yours through whom you can be reached.					
Name	Address (number and street)	City	State or foreign country		
23. Print your name here			Date prepared		

REFERENCE LIST A - MAJOR FIELDS OF STUDY			
<p>This list is to be used in answering question 1b about the field(s) in which you have obtained study or training. It is divided into two sections: Section I is a list of fields of academic study generally leading to bachelor's or higher degrees; Section II is a list of fields of study and training below those generally leading to a bachelor's degree.</p> <p>Please scan the entire list, choose the appropriate answer for the question and then enter the code and description in the appropriate section of question 1b. If none of the categories listed below adequately describes what you were studying or being trained in, use the "Other" category (code 600 or 625) and enter a brief description of what you were studying in the space provided on the questionnaire.</p>			
Section I - FIELDS OF ACADEMIC STUDY LEADING TO BACHELOR'S OR HIGHER DEGREES			
Code	Description	Code	Description
Biological and Agricultural Sciences and Related Fields 501 Agriculture, business 502 Agriculture, general 503 Agronomy, field crops 504 Anatomy and histology 505 Animal physiology 506 Animal science 507 Bacteriology, virology, mycology, parasitology 508 Biochemistry 509 Biology, general 510 Biophysics 511 Botany, general 512 Dairy science (dairy husbandry) 513 Entomology 514 Farm management 515 Fish and game or wildlife management 516 Food science (food technology and processing, dairy manufacturing and technology, food industry) 517 Forestry 518 Genetics 519 Horticulture 520 Immunology 521 Microbiology 522 Plant pathology 523 Plant physiology 524 Soil science (soil management, soil conservation) 525 Zoology, general 526 Biological and agricultural sciences, other fields Education 527 Biological sciences education 528 Mathematics education 529 Physical sciences education 530 Trade and industrial training 531 Education, other fields Engineering 532 Aerospace, aeronautical, astronautical, and related fields 533 Agricultural 534 Architectural 535 Chemical, petroleum refining 536 Civil, construction, transportation 537 Electrical, electronics 538 Engineering sciences, mechanics, physics 539 Engineering technology 540 Environmental/sanitary engineering 541 General or unified 542 Industrial 543 Mechanical 544 Metallurgical, materials, ceramics 545 Mining, mineral, geological 546 Naval architecture and marine engineering 547 Nuclear 548 Operations research/systems engineering 549 Petroleum 550 Engineering, other fields Health Fields 551 Medicine or premedicine, and clinical medical sciences 552 Nursing (4 year or longer program) 553 Pathology 554 Pharmacology 555 Pharmacy 556 Health Professions, other fields (4 year or longer program)		Mathematical Sciences 557 Mathematics 558 Statistics and actuarial sciences 559 Computer sciences and systems analysis 560 Operations research/management science Physical Sciences 561 Astronomy 562 Chemistry 563 Geography 564 Meteorology 565 Physics 566 Physical sciences, general 567 Geology and geophysics 568 Oceanography 569 Physical sciences, other fields Psychology 570 Clinical 571 Educational 572 General psychology 573 Psychology, other fields Social Sciences 574 Anthropology 575 Area studies, regional studies 576 Economics, agricultural 577 Economics, except agricultural 578 Foreign service Programs 579 Geography 580 History 581 Industrial relations 582 International relations 583 Political science or government 584 Public administration 585 Social sciences, general 586 Social work, social administration, social welfare 587 Sociology 588 Social sciences, other fields Arts, Humanities, and Other Specialties 589 Arts, general 590 Business and commerce, including accounting, hotel and restaurant administration, and secretarial studies 591 English and journalism 592 Fine and applied arts, all fields 593 Foreign language and literature, all fields 594 Geography 595 Home economics, all fields 596 Law or prelaw 597 Library science 598 Military science, including merchant marine deck officer 599 Philosophy, all fields 600 Religion and theology, all fields 600 Other (Describe briefly under the applicable item on the questionnaire.)	
Section II - FIELDS OF ACADEMIC STUDY AND OCCUPATIONAL TRAINING RELATED TO PROGRAMS BELOW THE BACCALAUREATE			
Code	Description	Code	Description
Data Processing-related fields of study or training 601 Computer programming 602 Computer operating 603 All other data processing fields of study or training Engineering-related fields of study or training 604 Drafting and design, all fields 605 Aeronautical technology 606 Architectural or building technology 607 Chemical technology 608 Civil technology 609 Electrical and electronics technology 610 Industrial technology 611 Mechanical technology 612 All other engineering-related fields of study or training Science-related fields of study or training 613 Agriculture 614 Forestry 615 Other science-related fields of study or training		Other fields of study or training 616 Business and commerce-related fields of study or training 617 Craft (skilled) occupations-related fields of study or training (such as carpentry, bricklaying, tool and die making, etc.) 618 Educational-related fields of study or training 619 Home economics 620 Nursing and other health service-related fields of study or training 621 Operative occupations-related fields of study or training (such as machine operation, driving, inspecting, etc.) 622 Police technology or law enforcement 623 Sales and marketing-related fields of study or training 624 Service occupations-related fields of study or training (such as cook, beautician, firefighter, etc.) 625 All other fields of study or training (Describe briefly under the applicable item on the questionnaire.)	

REFERENCE LIST B - KINDS OF BUSINESSES	
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This list is to be used in answering question 7 about the kind(s) of business or industry for which you worked. Please scan the entire list, choose the appropriate answer for the question and enter the code and description from this list. If none of the categories listed below adequately describes the kind of business for which you worked, use the "Other" category (code 731).

Code	Description	Code	Description
	Manufacturing		Other Kinds of Business
701	Aircraft, aircraft engines, aircraft parts	720	Agriculture, forestry, and fisheries
702	Chemicals and allied products	721	Business, personal, and professional services
703	Electrical machinery, equipment and supplies for the generation, storage, transformation, transmission, and utilization of electrical energy	722	Construction
704	Electronic apparatus, radio, television and communication equipment and parts	723	Engineering or architectural services
705	Electronic computers, accounting, calculating and office machinery and equipment	724	Finance, insurance, or real estate
706	Fabricated metal products (except ordnance, machinery and transportation equipment)	725	Mining and petroleum extraction
707	Machinery (except electrical) including engines and turbines, farming and construction machinery, mining, metalworking and other manufacturing and service industry machines	726	Private, nonprofit organizations other than educational institutions and hospitals
708	Motor vehicles and motor vehicle equipment including trucks, buses, automobiles, railroad engines and cars	727	Professional and technical societies
709	Ordnance, including manufacture of arms, ammunition, tanks, and complete guided missiles, space vehicles and equipment	728	Research institutions
710	Petroleum refining and related industries	729	Retail and wholesale trade
711	Primary metal industries, including smelting, refining, rolling, drawing, alloying, and manufacture of castings, forgings and other basic metal products	730	Transportation, communication, or other public utilities
712	Professional and scientific equipment and supplies	731	Other: (Describe briefly under the applicable item on the questionnaire.)
713	Other manufacturing including printing and publishing		
	Educational institutions		
714	College or university (offering at least a bachelor's degree)		Public Administration (include only uniquely governmental activities, such as the U.S. Postal Service, U.S. Air Force, State court, Department of Motor Vehicles, city building inspection, or city public welfare. For example, if you work for the U.S. Postal Service use code 733, Federal public administration; on the other hand, if you work at a Veterans' Administration Hospital, use code 718.
715	Junior college or technical institute		Hospital or clinic; if you work at a State university, use code 714, College or university; if you work for a county road building agency, use code 722, Construction; if you work in a Defense Department research laboratory, use code 728, Research institution.)
716	Medical school		
717	Other educational institutions	732	Uniformed military service
	Health Services	733	Federal public administration
718	Hospital or clinic	734	State public administration
719	Other medical and health services	735	Local public administration (city, county, etc.)
		737	Regional government
		736	Other government

REFERENCE LIST C - OCCUPATIONS

This list is to be used in answering questions 8 and 19 about your occupational classification. Please scan the entire list, choose the appropriate entity and enter the code and description from this list. If you cannot find exactly the right entity, please choose the one that comes nearest to it. If none of the entities is at all appropriate, use the "Other" category (code 475) and enter a brief description in the space provided on the questionnaire.

Code	Description	Code	Description
	Engineers, including college professors and instructors		Health Occupations, including persons who are primarily practitioners. Persons engaged primarily in medical research, teaching, and similar activities use code 432, Medical Scientist.
401	Engineer, aeronautical and astronautical	438	Physician or surgeon
402	Engineer, agricultural	433	Technician, dental
403	Engineer, chemical	440	Technician, medical
404	Engineer, civil and architectural	441	Other health occupation (Describe briefly under the applicable item on the questionnaire.)
405	Engineer, electrical and electronic		Technicians and Technologists, except medical
406	Engineer, industrial	442	Designer, electronic parts and machine tools
407	Engineer, mechanical	443	Designer, industrial
408	Engineer, metallurgical and materials	444	Designer, other
409	Engineer, mining, petroleum, and geological	445	Craftsman
410	Engineer, nuclear	446	Surveyor
411	Engineer, environmental and sanitary	447	Technician, biological and agricultural
412	Engineer, operations research systems	448	Technician, electrical and electronic
413	Engineer, other fields (Describe briefly under the applicable item on the questionnaire.)	449	Technician, construction, highways, and architectural
	Computer Specialist, including college professors and instructors	450	Technician, mechanical
414	Computer programmer	451	Technician, other engineering
415	Computer systems analyst	452	Technician, physical science
416	Computer scientist	453	Technician, other fields (Describe briefly under the applicable item on the questionnaire.)
417	Other computer specialist (Describe briefly under the applicable item on the questionnaire.)		Teachers
	Mathematicians and Statisticians, including college professors and instructors	454	Teacher, elementary school
418	Actuary	455	Teacher, secondary school
419	Mathematician	456	Teacher, college and university, excluding engineering and science (Engineering and science teachers see codes 401-437 above.)
420	Statistician		Administrators, Managers, and Officials, excluding farm
421	Operations research analyst	476	Urban and regional planner
	Physical Scientists, including college professors and instructors	477	College president or dean
422	Chemist	478	Administrator or manager, scientific and technical research and development
423	Earth scientists including geologists, geophysicists, etc.	479	Administrator or manager, production and operations
424	Physicist, astronomer	480	Administrator, manager, or official, all other, excluding self-employed
425	Atmospheric scientist, meteorologist	481	Self-employed proprietor
426	Oceanographer		All Other Occupations
427	Other physical scientist (Describe)	462	Accountant
	Biological Scientists, including college professors and instructors	463	Attorney or judge
428	Agricultural scientists, including foresters and conservators	464	Sales worker
429	Biological scientist	465	Clerical worker (such as bookkeeper, secretary, etc.)
430	Biochemist	466	Clergy
431	Biophysicist	467	Craft worker (such as baker, carpenter, electrician, mechanic, repair worker)
432	Medical scientist, excluding persons who are primarily medical practitioners; see Health Occupations	468	Farmer (owner, manager, tenant, or farm laborer)
433	Other biological scientist (Describe)	469	Fire fighter or police
	Social Scientists, including college professors and instructors	470	Laborer, except farm
434	Economist	471	Librarian
435	Psychologist	472	Merchant or shopkeeper, self-employed
436	Psychologist or anthropologist	473	Operative (such as assembler, factory worker, miner, welder, truck driver, etc.)
437	Other social scientist (Describe briefly under the applicable item on the questionnaire.)	474	Postal worker
		475	Other occupations, not specified above (Describe briefly under the applicable item on the questionnaire.)